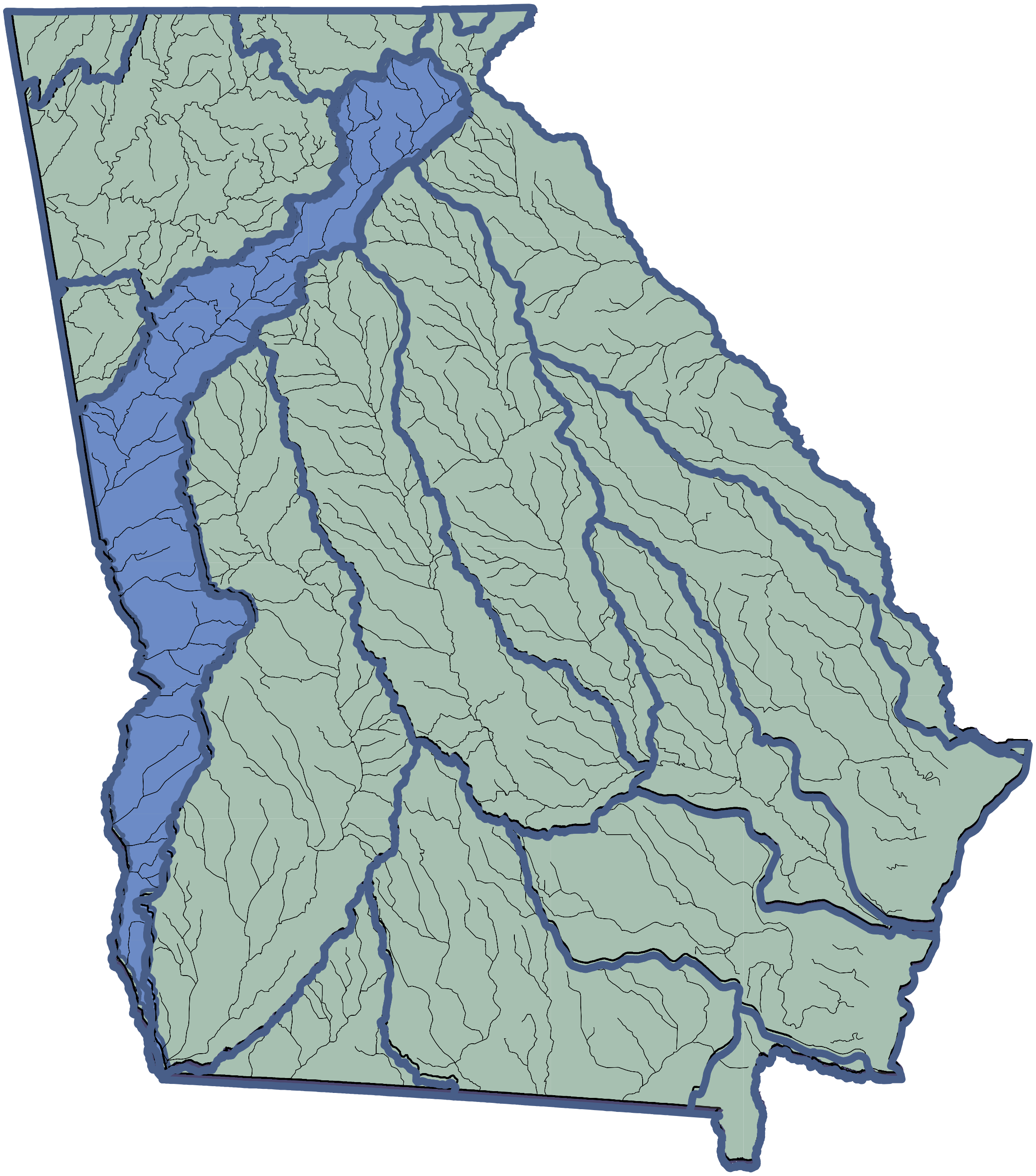
CHATTAHOOCHEE RIVER BASIN MANAGEMENT PLAN 1997



GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Chattahoochee River Basin Management Plan 1997

Preface

This report was prepared by the Environmental Protection Division (EPD), Georgia Department Natural Resources (EPD). It represents a snapshot of the EPD files and, in certain cases, information has been presented in summary form from those files. The reader is therefore advised to use this condensed information with the knowledge that it is a summary document and more detailed information is available in the EPD files.

Comments or questions related to the content of this report are invited and should be addressed to:

Environmental Protection Division
Georgia Department of Natural Resources
Floyd Towers East
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Flint River Basin
Management Plan 1997

Preface

This report was prepared by the Environmental Protection Division (EPD), Georgia Department Natural Resources (EPD), as required by O.C.G.A. 12-5-520 and as a public information document. It represents a synoptic extraction of the EPD files and, in certain cases, information has been presented in summary form from those files. The reader is therefore advised to use this condensed information with the knowledge that it is a summary document and more detailed information is available in the EPD files.

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List of Acronyms and Abbreviations

Ac	acre
Ac-ft	acre-feet
ACF	Apalachicola-Chattahoochee-Flint Basin
ACT/ACF	Alabama-Coosa-Tallapoosa/Apalachicola-Chattahoochee Flint Basin
ADEM	Alabama Department of Environmental Management
ARC	Atlanta Regional Commission
ARS	USDA Agricultural Research Service
BMPs	best management practices
BOD	biochemical oxygen demand
CAES	University of Georgia College of Agricultural and Environmental Sciences
Cd	cadmium
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CPUE	catch per unit effort (fishing)
CRMP	Chattahoochee River Modeling Project
CRP	Conservation Reserve Program
CSGWPP	Comprehensive State Ground Water Protection Plan
CSMTF	Community Stream Management Task Force
CSO	Combined Sewer Overflow
Cu	copper
CWA	U.S. Clean Water Act
DCA	Georgia Department of Community Affairs
DNR	Georgia Department of Natural Resources
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FFY	Federal fiscal year
FIP	Forestry Incentives Program
FSA	Farm Service Agency
ft	feet
ft^2/d	square feet per day
ft^3/s	cubic feet per second
gal/m	gallons per minute

GDA	Georgia Department of Agriculture
GEMA	Georgia Emergency Management Agency
GFA	Georgia Forestry Association
GFC	Georgia Forestry Commission
GPC	Georgia Power Company
GPD	gallons per day
GSWCC	Georgia Soil and Water Conservation Commission
Hg	mercury
HUC	Hydrologic unit code (USGS)
IBI	Index of Biotic Integrity
kg	kilogram
km^2	square kilometer
kW	kilowatt
LAS	land application system for wastewater
LUST	leaking undeground storage tank
MCL	Maximum Contaminant Level for drinking water
meq/l	milliequivalent
mg/l	milligrams per liter
MG	million gallons
MGD	million gallons per day
mi^2	square miles
ml	milliliter
MLMP	Major Lakes Monitoring Project
MOU	memorandum of understanding
MPN	most probable number (for quantification of fecal coliform bacteria)
MS4	municipal separate stormwater system
M&I	municipal and industrial
NFIP	National Flood Insurance Program
NOI	notice of intent
NPDES	National Pollution Discharge Elimination System
NPS	nonpoint source
NRCS	Natural Resources Conservation Service of USDA
NURE	National Uranium Resource Evaluation
NWI	National Wetlands Inventory (USF&WS)
Pb	lead
PCB	polychlorinated biphenyl
ppm	parts per million; equivalent to mg/l
RBMP	River Basin Management Planning

RBP	Rapid Bioassessment Protocol
RC&D	Resource Conservation and Development Council
RDC	Regional Development Center
RM	river mile
SCS	Soil Conservation Service (now NRCS)
SOCs	Synthetic Organic Chemicals
STATSGO	State Soil Geographic Database (USDA)
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load, as specified in the CWA
TTSI	Georgia combined lake trophic state index
UGA	University of Georgia
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WET	whole effluent toxicity
WHIP	Wildlife Habitat Incentives Program
WPCP	water pollution control plant
WRD	Georgia Wildlife Resources Division
WRP	Wetland Reserve Program
WWTP	wastewater treatment plant
Zn	zinc
µg/l	micrograms per liter
7Q10	7-day average low flow with a once-in-ten-year recurrence interval

Executive Summary

Overview

This document is a management plan for the Chattahoochee River basin. It has been produced as part of Georgia's River Basin Management Planning (RBMP) approach to water resource management, begun in 1993, and fulfills requirements of the Georgia River Basin Planning Act . The purposes of this basin planning process are to assess water quantity and quality, target priority issues, and encourage efforts to support effective water resources management. This plan provides information on key river basin characteristics, describes the status of water quality and quantity in the Chattahoochee River basin, identifies present and future water resource demands, presents and facilitates the implementation of water protection efforts, and enhances stakeholder understanding and involvement in basin planning.

Georgia's RBMP is an effort to facilitate the protection and enhancement of rivers, streams, lakes, estuaries, and ground water through comprehensive and integrated, regulatory and non-regulatory water resources management. The river basin provides a functional unit for coordinating management efforts that integrate terrestrial, aquatic, geologic, and atmospheric processes. This is the first river basin management plan produced under RBMP for the Chattahoochee River basin. RBMP provides an iterative, cyclical approach to water resources management, and the Chattahoochee River basin plan will be updated every five years. A draft of the plan was reviewed by governmental partners, the Chattahoochee River Basin Advisory Committee, and the public. Stakeholder meetings were in Helen, Atlanta, and Columbus in September, 1997 to solicit comments and recommendations regarding the river basin management plan.

It is a basic premise of the RBMP approach that river basin management is more efficient and effective when all stakeholders—government agencies, local governments, farmers, industries, landowners, environmentalists, etc.—participate in the process, and share knowledge and resources. A major purpose of this plan is to provide information to the public and encourage involvement of interested stakeholders in the management of the resources of the Chattahoochee River basin.

Basin Description

The Chattahoochee River covers a distance of 434 miles in a narrow swath across the state of Georgia, beginning in the Blue Ridge Mountains of Union County, flowing past metropolitan Atlanta, reaching the Georgia/Alabama border at West Point Lake, and thence south to terminate in Lake Seminole. The basin contains parts of the Blue Ridge, Piedmont, and Coastal Plain physiographic provinces that extend throughout the southeastern United States. Total area of the basin is 8,770 square miles, of which 6,140 square miles (70%) lie in Georgia, 2,574 square miles (29%) lie in Alabama, and 56 square miles (1%) lie in Florida.

In its mountain headwaters above Lake Lanier, the Chattahoochee is free flowing, with many trout streams. From Lake Lanier south, the river has been highly modified and controlled by human activities. In the Atlanta metropolitan area, the river is the major source of drinking water for a burgeoning urban population; it also assimilates much of the area's treated municipal wastewater discharges. South of Atlanta, the basin land use again becomes more rural, with the exception of the Columbus area. From West Point Lake to Lake Seminole, flow in the river is strongly controlled by a series of eleven dams, which variously provide hydropower generation, water supply, recreational opportunities in impoundments, and, below Columbus, commercial navigation.

As of 1990, nearly two million people lived in the Chattahoochee River basin, about three quarters of them in the metropolitan Atlanta area. Despite the large population, much of the basin is rural in character, and about 66 percent of the total land area is occupied by forest land. Agriculture is also important, with about 12% of the land area occupied by row crops, livestock and poultry production, and other agricultural operations.

Water Quantity

Water in the Chattahoochee River basin supports many uses including aquatic life, municipal drinking water, industrial water supply, agricultural irrigation, recreation, hydropower production, navigation, and waste assimilation. Water withdrawals from surface and ground water sources have increased substantially in the last quarter century, resulting in greater demands on what are essentially finite supplies. This trend is expected to continue, with municipal and industrial demand projected to increase by approximately 39 million gallons per day (MGD) over the next 20 years, and agricultural demand by about 35 MGD for the same period. As demands increase, it may become increasingly difficult to satisfy competing uses.

Concerns about the availability of water for future needs have prompted the States of Alabama, Florida and Georgia to form an interstate compact for management of the Alabama-Coosa-Tallapoosa and the Apalachicola-Chattahoochee-Flint (ACT/ACF) basins. This agreement is expected to establish some form of commitment for Georgia to allow specified quantities of water from the Chattahoochee River basin to pass to Alabama and Florida. The agreed upon water allocation formula must provide sufficient water supply to satisfy Georgia through the year 2050 and keep sufficient flows in the river to support waste assimilation, aquatic habitat, and fishery needs. Such a commitment will not establish how water would be used within Georgia, but it is possible that there may be limitations on the total amounts of water that can be utilized by Georgians from the Chattahoochee River.

Water Quality

Water quality within the Chattahoochee River basin is generally good, and has been improving as major point source discharges of wastewater have been placed under stringent controls during the last three decades. For instance, conditions in the Chattahoochee below Atlanta have improved dramatically since the early 1970's as more advanced treatment of municipal wastewater was required. Yet, some waters in the basin currently are only partially supporting or not supporting their designated uses, and require additional management.

Protection of water quality in Georgia is regulated by a number of federal and state laws, including the Federal Clean Water Act, and the State Water Quality Control Act. An important component of the state's water quality protection efforts is the promulgation of water quality standards, which consist of water use classifications, general narrative standards, and numeric standards for water quality parameters and toxic substances. Water quality standards serve as a target for water protection efforts and as a baseline for water quality assessment.

Georgia carries out monitoring of water quality to assess water quality and support the state's new RBMP approach. Monitoring includes monthly sampling for a number of parameters at a number of stations each year, sampling of surface water and fish tissues for toxic substances, intensive stream studies, monitoring of major lakes, facility compliance sampling, and assessment of biological communities. As part of the RBMP approach, many monitoring stations are rotated to focus on different basins each year, on a five-year cycle. Every two years, the state publishes a water quality assessment report, required by section 305(b) of the Clean Water Act. Based upon monitoring results and other evidence, waters of the state are assessed as supporting, partially supporting, or not supporting designated uses, as described in section 5 of this river basin plan. The most recent water quality assessment report was published in 1996; the assessments of waters of the Chattahoochee River basin are provided in Appendix E.

Water quality is affected by changes to the environment (referred to as *stressors*) which may adversely affect aquatic life or impair human uses of a waterbody. It may be a direct load of a pollutant, or other source of stress. Identified stressors currently affecting water quality in some segments of the Chattahoochee River basin may include metals, fecal coliform bacteria, sediment, oxygen-depleting waste, and alteration of natural flows.

Stressors come from many different sources. In the past, the major focus of management was on concentrated *point sources* from municipal or industrial water pollution control facilities. But the pollution impact on Georgia's streams has shifted over the last two decades. Streams are no longer dominated by untreated or partially treated wastewater discharges which resulted in little or no aquatic life and threats to human health. The wastewaters are now treated, oxygen levels have recovered, and fisheries have followed. However, other sources of pollution are now affecting Georgia's streams. These sources are referred to as *nonpoint*, and consist of mud, litter, bacteria, pesticides, fertilizers, metals, oils, grease, and a variety of other pollutants which are washed from rural and urban lands by stormwater. Expected growth in population and employment in the basin will mean more potential stress from stormwater runoff and nonpoint source loading.

Priority Issues and Management Strategies

Within a few localized waterbody segments of the Chattahoochee River basin, water quality problems are attributed to permitted point source discharges from municipal wastewater treatment plants or industries. EPD has regulatory authority over these discharges, and has instituted corrective actions.

The vast majority of identified water quality problems are attributed, in whole or in part, to nonpoint sources. A full list of priority issues for water quality management in the Chattahoochee River basin is provided in Section 6, and proposed management strategies are discussed in Section 7. Among the most important and widespread issues are the following:

- Violations of water quality standards for metals associated with urban nonpoint source runoff;

- Violations of water quality standards for fecal coliform bacteria, associated with both urban and rural nonpoint source runoff; and

- Erosion and sedimentation, variously associated with construction, agriculture, forestry, and unpaved rural roads, leading to degradation of aquatic habitat, which can reduce biological diversity.

Other problems, such as low dissolved oxygen, elevated water temperatures, nutrients, and residual contamination of fish tissue by banned toxic organic chemicals (PCBs, Chlordane) are also important within specific segments.

Because there are so many small sources of nonpoint loading spread throughout the basin, they are not amenable to control by state agency permitting and enforcement, even where regulatory authority exists. Rather, control of nonpoint loading will require the cooperative efforts of many partners, including state agencies, individual landowners, agricultural and forestry interests, local county and municipal governments, and Regional Development Councils. A key reason for adopting the RBMP approach is to provide a forum for coordinating the activities of these many partners. Key aspects of this management approach include developing equitable management strategies which do not impose an unfair burden on any one sector, and encouraging planning for the future as population increases and land uses change. In urban areas, local governments will need to play a major role in curbing nonpoint source pollution through zoning and land management and stormwater management.

The strategies presented in Section 7 recognize the need to develop cooperative management approaches involving all partners. Accordingly, important aspects of these strategies are the identification of key participants and roles, and proposed action plans, to address a specific priority issues over the next five year cycle of the basin plan. Because this is the first basin-wide management plan for the Chattahoochee River basin under RBMP, it is expected that these strategies will evolve and improve over time.

Next Steps

This plan constitutes another step in management of the water resources in the Chattahoochee River Basin, but not the final step. It is important for all to understand that there will never be a final step. Management is ongoing and dynamic because changes in resource use and condition occur continually, as do changes in management resources and perspectives. Therefore, management planning and implementation must remain flexible and adapt to changing needs and capabilities.

Following a brief period to focus on implementation of this plan, the Chattahoochee River basin will enter into its second iteration of the basin management cycle (scheduled for April, 1999). The next cycle will provide opportunity to review issues that were not fully addressed during the first cycle and to reassess water and identify new issues. Partners will not have to start from scratch during the next iteration. The information in this document can serve as a foundation for future work.

Section 1
Introduction

1.1 Purposes and Organization of This Plan

This document presents Georgia's river basin management plan for the Chattahoochee River, which is being produced as a part of Georgia's River Basin Management Planning (RBMP) approach (described in section 1.2 below).

A river basin management plan is intended to facilitate the coordination of water quality and quantity management efforts of public and private sector partners within the practical management unit that a river basin provides. The purposes of this plan are to provide information on key river basin characteristics, describe the status of water quality and quantity in the Chattahoochee River basin, identify present and future water resource demands, present and facilitate the implementation of water protection efforts, and enhance stakeholder understanding and involvement in basin planning. This plan should help to achieve goals of river basin management such as providing environmental education, improving water quality, reducing pollution at the source, improving aquatic habitat, reestablishing native species of fish, restoring and protecting wildlife habitat, meeting water supply needs, providing recreational benefits, and other goals.

Begun in 1993, RBMP is a new approach to the management of Georgia's water resources. This is the first river basin management plan produced under RBMP for the Chattahoochee River. RBMP is an iterative, cyclical approach to water resources management; under this approach, the Chattahoochee River plan will be updated every five years. During the first iteration of RBMP in Georgia, much effort and resources are being dedicated to making programmatic changes, building the infrastructure of RBMP, cataloging current water management activities and beginning to coordinate with the many agencies, organizations, and individuals that have a stake in river basin management. As a result, some portions of the RBMP cycle have had to be condensed during this first iteration; in particular, it has not been possible to spend as much effort on developing management strategies as is planned for future iterations. Future iterations of the basin planning cycle will provide a better opportunity for developing new, innovative, and cost-effective strategies for managing water quality and quantity.

This plan has been produced by the Georgia Department of Natural Resources Environmental Protection Division (EPD), based on data and information gathered by EPD, other state and federal agencies, universities, utilities, consultants, and environmental groups. A basin team made up of representatives from the Georgia Soil and Water Conservation Commission (GSWCC), the Natural Resources Conservation Service (NRCS), Georgia Department of Natural Resources Wildlife Resources Division (WRD), Georgia Forestry Commission (GFC), and EPD's Water Resources Management Branch and Water Protection Branch compiled the information to generate the plan. The United States Geological Survey (USGS) and the EPD Geological Survey Branch created the majority of the figures in this report using geographic information system technologies.

The draft plan was reviewed by governmental partners, the Chattahoochee River Basin Advisory Committee, and the public. Stakeholder meetings were held in Helen, Atlanta, and

Columbus in September, 1997 to solicit comments and recommendations regarding the river basin management plan. Following this review, appropriate modifications were made to the plan, and the final plan was submitted for review and acceptance by the Board of the Georgia Department of Natural Resources. Section 1.3 below provides more detailed description of the planning cycle for the Chattahoochee River basin, including opportunities for involvement by interested agencies, organizations, citizens, and industry.

This plan is organized into the following sections:

Executive Summary: The executive summary provides a broad perspective on the condition of the basin and the management strategies recommended to protect and enhance the Chattahoochee River basin's water resources.

1.0 Introduction: The introduction provides an explanation of the legal, programmatic, and ecological bases for a watershed protection approach in Georgia, a description of Georgia's River Basin Management Planning approach, and a presentation of the planning cycle for the Chattahoochee River basin, including opportunities for stakeholder involvement.

2.0 River Basin Characteristics: A thorough description of the basin and its important characteristics is provided, including boundaries, climate, physiography and geology, geochemistry, soils, surface water resources, ground water resources, biological resources, population and land use, local government and jurisdictions, and water use classifications.

3.0 Water Quantity: Surface and ground water availability is described, and forecasts are made for future demand. This chapter also includes sections on historic, present and possible proposed permitting activities pertaining to water availability.

4.0 Environmental Stressors: A "stressor" is defined as any physical, chemical or biological factor that may impair water or habitat quality, or result in insufficient water supply to meet the needs of Georgia's citizens. Stressors to water and habitat quality in the basin are examined in detail with a listing of point sources (NPDES permitted discharges) as well as nonpoint sources resulting from land uses and atmospheric deposition.

5.0 Assessment: An assessment of water quality and quantity in the streams, lakes, estuaries, and groundwater is provided along with an assessment of the basin's biological integrity. The data sources and analysis techniques for these assessments are discussed.

6.0 Concerns and Priority Issues: Issues of concern identified through assessment are summarized and prioritized in this section.

7.0 Implementation Strategies: Strategies for addressing issues of concern are presented in the order that they appear on the priority list with a description of each issue, goals and objectives of management, overview of alternatives considered, and descriptions of recommended options for implementation.

8.0 Future Issues and Challenges: Due to limited resources (data, time, funding, etc.), some issues will be addressed in future iterations of each basin planning cycle. Long-range goals are discussed to set the stage for further improvements in managing water resources and water quality.

Appendices: The appendices contain technical information for those interested in specific details involved in the planning process.

1.2 Georgia's Watershed Protection Approach

1.2.1 The Beginning of RBMP

Georgia's watershed protection approach, river basin management planning (RBMP), is an effort to facilitate the protection and enhancement of its rivers, streams, lakes, estuaries, and ground water aquifers. The water resources of these natural systems support aquatic and terrestrial life, as well as man's beneficial uses including drinking water, recreation, waste assimilation, and others. Increasing growth pressures in areas of Georgia and the accompanying demands on water resources, punctuated by recent droughts and floods, have highlighted the importance of water resources.

EPD is responsible for facilitating water resources management in the State, including water quality and water supply. Regulatory activities such as pollutant discharge permitting, water withdrawal permitting, water quality monitoring, drinking water and wastewater treatment facility compliance monitoring, and others are the responsibility of EPD. Historically, EPD has

Georgia River Basin Planning Enabling Legislation

In 1992, the Georgia General Assembly passed a law (O.C.G.A. 12-5-520, see Appendix "A") which assigned to EPD the responsibility of developing river basin management plans. The law designated the Chattahoochee, Flint, Coosa, and Oconee Rivers as the first basins to be addressed. The legislation included several requirements for river basin planning as summarized below:

- Provide for the development of river basin management plans for certain rivers;
- Provide for the contents of river basin management plans;
- Provide for the appointment and duties of local advisory committees;
- Provide for notice and public hearing;
- Provide for submission of plans to the Board of Natural Resources for adoption;
- Provide that this Act shall not enlarge the powers of the Department of Natural Resources.

The law requires that each river basin management plan include a description of the basin or watershed, identification of local governments in each basin, land use inventory, and a description of plan goals which may include providing environmental education, improving water quality, reducing pollution at the source, improving aquatic habitat, reestablishing native species of fish, restoring and protecting wildlife habitat, and providing recreational benefits. A description of the strategies and measures necessary to accomplish the goals is also to be a part of each management plan. The law also requires a seven person local advisory committee be appointed to provide advice and council to EPD during the plan development.

In response to this law, EPD has adopted the RBMP approach to watershed protection. This approach meets, and in some ways exceeds, the requirements of the law. For example, under the scheduling provisions of the RBMP law it would take approximately 16 years to complete the plans for all fourteen river basins. The schedule proposed by the EPD provides for the fourteen plans to be completed in approximately 11 years (see section 1.2.2.3 below). Also, the law does not require the river basin plans to be updated on a rotating basis as is currently planned by the EPD. Finally, the EPD has included water quantity issues in the planning process, which is not required by the law.

used a regulatory approach to address water resources management. Although this type of regulatory approach has been successful in managing water supply and improving the water quality of Georgia's surface waters, it will be less effective in resolving present and future water resources issues and management challenges that fall outside of EPD's authority or that require voluntary actions.

EPD initiated its first watershed planning efforts in the early 1970s in response to provisions in the Federal Water Pollution Control Act Amendments of 1972 and developed river basin plans for each major river basin in Georgia. The plans focused on water quality and pollution from inadequate wastewater treatment and strategies were developed for upgrading municipal and industrial wastewater treatment plants. The first edition of *Chattahoochee River Basin Water Quality Management Plan* was published in October, 1973. The second edition of the plan was completed in 1978 and was updated in 1984. The information on wastewater treatment plant discharges was updated in the plan on an annual basis through 1993. In the mid-1980s attention was focused on water availability and use. EPD developed plans for each river basin and the report *Water Availability and Use-Chattahoochee River Basin* was published in 1985. The objectives of the plan were to summarize current use of water resources in the basin, to identify areas with current or projected problems in meeting water supply needs, and to recommend management criteria to meet supply needs and protect water resources. In the 1990s across the nation and in Georgia, comprehensive multi-disciplined, multi-jurisdictional, and integrated (*i.e.* regulatory and non-regulatory) water resources management approaches are gaining acceptance and implementation. This trend has encouraged many agencies and programs at the local, state, and federal levels to use geographic boundaries representing watersheds as the basis for coordinating and integrating water resources management-these are referred to as watershed protection approaches.

Watersheds provide a functional spatial unit for coordinating management efforts that integrate terrestrial, aquatic, geologic, and atmospheric processes. The aquatic portions of watersheds are directly affected by the surface and subsurface terrestrial environment, ground water, adjacent coastal environments, and overlying atmosphere; and are strongly influenced by hydrologic cycles and human interactions. The integrated nature of watersheds provides a framework for supporting resource management. Such an approach can enhance decisions that balance restoration and long-term protection, and promote wise management of watershed resources.

The State of Georgia adopted RBMP in late 1992. Per provisions of the legislation, local advisory committees for the Chattahoochee, Flint, Coosa, and Oconee River Basins were convened in 1993, consisting of a cross section of stakeholder interests including local governments, agriculture, industry, forestry, environmental groups, and landowners. The four basin committees met together in January, 1994, in a facilitated meeting and finalized the Mission statement and 11 of the 12 Goals presented in Figure 1-1. These statements establish the guiding principles, and convey the purpose of RBMP to stakeholders and staff. The Vision is the contemplated outcome of RBMP, while the Mission statement describes the type of program needed to make the Vision a reality. The Mission implies the nature of the program components, goals and objectives, and demonstrates commitment. The Goals describe what must be accomplished to support the Mission.

In order to develop a framework for implementing RBMP in Georgia, a workgroup was convened consisting of representatives of the Water Protection and Water Resources Branches of EPD and the WRD. The U. S. Environmental Protection Agency provided funding in 1994 for a

VISION: CLEAN WATER Clean Water to drink, Clean Water for aquatic life, and Clean Water for recreation, in adequate amounts to support all these uses throughout the Chattahoochee River Basin.
MISSION: To develop and implement a river basin planning program to protect, enhance, and restore the waters of the State of Georgia, that will provide for effective monitoring, allocation, use, regulation, and management of water resources.
GOALS: 1) To meet or exceed local, state, and federal laws, rules, and regulations. And be consistent with other applicable plans. 2) To identify existing and future water quality issues, emphasizing nonpoint sources of pollution. 3) To propose water quality improvement practices encouraging local involvement to reduce pollution, and monitor and protect water quality. 4) To involve all interested citizens and appropriate organizations in plan development and implementation. 5) To coordinate with other river plans and regional planning. 6) To facilitate local, State, and federal activities to monitor and protect water quality. 7) To identify existing and potential water availability problems and to coordinate development of alternatives. 8) To provide for education of the general public on matters involving the environment and ecological concerns specific to each river basin. 9) To provide for improving aquatic habitat and exploring the feasibility of re-establishing native speicies of fish. 10) To provide for restoring and protectng wildlife habitat. 11) To provide for recreational benefits. 12) To identify and protect flood prone areas within each riverbasin, and encourage local and State compliance with federal floodplain management guidelines.

Figure 1-1. Georgia River Basin Management Planning Vision, Mission, and Goals

consultant with experience in basinwide planning to act as a facilitator to this framework development workgroup. The workgroup developed core components of the framework including a basin planning cycle, basin plan outline, basin groupings, planning schedules, and activity guides. The workgroup also designed the basin team concept, outlining team responsibilities and how the team complements stakeholder forums such as local advisory committees and public meetings. The RBMP framework document produced by this workgroup describes the framework in more detail and provides the guidance to coordinate and integrate EPD and other partner activities within the RBMP framework. An overview of the RBMP framework components is provided in section 1.2.2.

The twelfth goal listed in Figure 1-1 was added by the EPD framework development workgroup after further review and discussion. The framework development workgroup also refined a list of objectives (Figure 1-2) that represent activities necessary to achieve the RBMP Goals. Taken

1) Provide Information on Key River Basin Characteristics
- Illustrate river basin and nested watershed boundaries.
- Describe river basin hydrology and hydrogeology.
- Describe water usage within the river basin, along with stream classifications
- Summarize important biological resources in the river basin, including threatened and endangered species, sport fishing populations, and habitat.
- Describe local government jurisdictions, including key watershed protection provisions.
- Summarize land use / land cover within the river basin.
- Identify important water quality stressors, including causes and sources of impairment.

2) Assess Water Quality
- Compare existing water quality with standards and identify water quality issues related to use attainment.
- Identify other water quality issues not related to standards (i.e., biological integrity, habitat).
- Establish priorities among issues for protection, enhancement, or restoration of waters within the river basin.

3) Update Existing Water Usage and Available Supply Plans
- Identify water supply issues.

4) Identify Future Water Resource Demands
- Project point and nonpoint source pollution loadings to predict waste assimilation demands.
- Project water supply demands.
- Identify other key demands.

5) Develop and Implement Management Plans
- Establish pollutant loading allocations, as appropriate, for point and nonpoint sources.
- Identify methods and means for implementing elements of the river basin management plan, including EPD roles and responsibilities.
- Provide guidance to local governments and industries to reduce or limit nonpoint source loadings.
- Develop and implement public education programs to raise awareness of management needs and increase public involvement in river basin management plan implementation.
- Implement monitoring program using environmental indicators and program measures to track and evaluate the effectiveness of the river basin management plan.

Figure 1-2. Georgia River Basin Management Planning Objectives

together, these Vision, Mission, Goals, and Objectives statements represent the foundation of the RBMP framework development and implementation. Figure 1-3 lists some of the laws related to water resources management that can be coordinated to achieve RBMP Goals and Objectives.

Federal, state, and local governments and agencies play a major role in all water resource protection and enhancement programs across Georgia. Creating and supporting governmental partnerships will be another guiding principle of the river basin management planning program in Georgia. Initial efforts to foster partnerships culminated in a governmental partners meeting in January, 1995, hosted by EPD. Federal, state, and local government representatives participated in presentations of the national and Georgia watershed protection approaches and discussed ways to work together on RBMP in Georgia. It should be emphasized that the Georgia program will address both surface and ground water quality and supply issues. This comprehensive approach to water resource management and protection is a cornerstone of Georgia's program for RBMP.

To meet the stated goals and objectives for RBMP, numerous government programs will need to coordinate their efforts. Many of these programs operate under separate environmental laws. The key laws that apply to water resources management in the State are presented below. These laws represent some of the regulatory mechanisms and strategies to be used to achieve the goals of RBMP.

Federal Clean Water Act
Federal Rivers and Harbors Act
Federal Water Resources Planning Act
Federal Agriculture and Water Policy Coordination Act
Federal Watershed Protection and Flood Protection Act
Federal Flood Control Act
Federal Safe Drinking Water Act
Georgia Water Quality Control Act
Georgia Erosion and Sedimentation Control Act
Georgia Comprehensive Planning Act
Georgia Safe Drinking Water Act
Georgia Mountain and River Corridor Protection Act
Georgia Environmental Policy Act
Sewage Holding Tank Act
Surface Mining Act
Ground Water Use Act

Figure 1-3. Georgia Water Resources and Related Environmental Laws and Programs

1.2.2 RBMP Framework Elements

The RBMP framework consists of several elements working together to achieve the goals of the approach. These elements include the following and are discussed in further detail in the subsections below:

- River Basin Management Units
- RBMP Cycle
- River Basin Groups and Planning Schedule
- Forums for Involving Stakeholders in RBMP

1.2.2.1 River Basin Management Units

The State's major river basins will provide the geographical framework and focus for RBMP. Fourteen major river basins have been defined in the State of Georgia and are shown on Figure 1-4. These river basins are the Altamaha, Chattahoochee, Coosa, Flint, Ochlockonee, Ocmulgee, Oconee, Ogeechee, Saint Marys, Satilla, Savannah, Suwanee, Tallapoosa, and Tennessee. River basin management plans will be prepared for each of these major river basins. State regulatory programs and support activities, normally allocated statewide, will be focused in each major river basin on a rotating schedule to achieve the following objectives:

- Facilitate efficient use of limited financial and personnel resources for water resource activities.

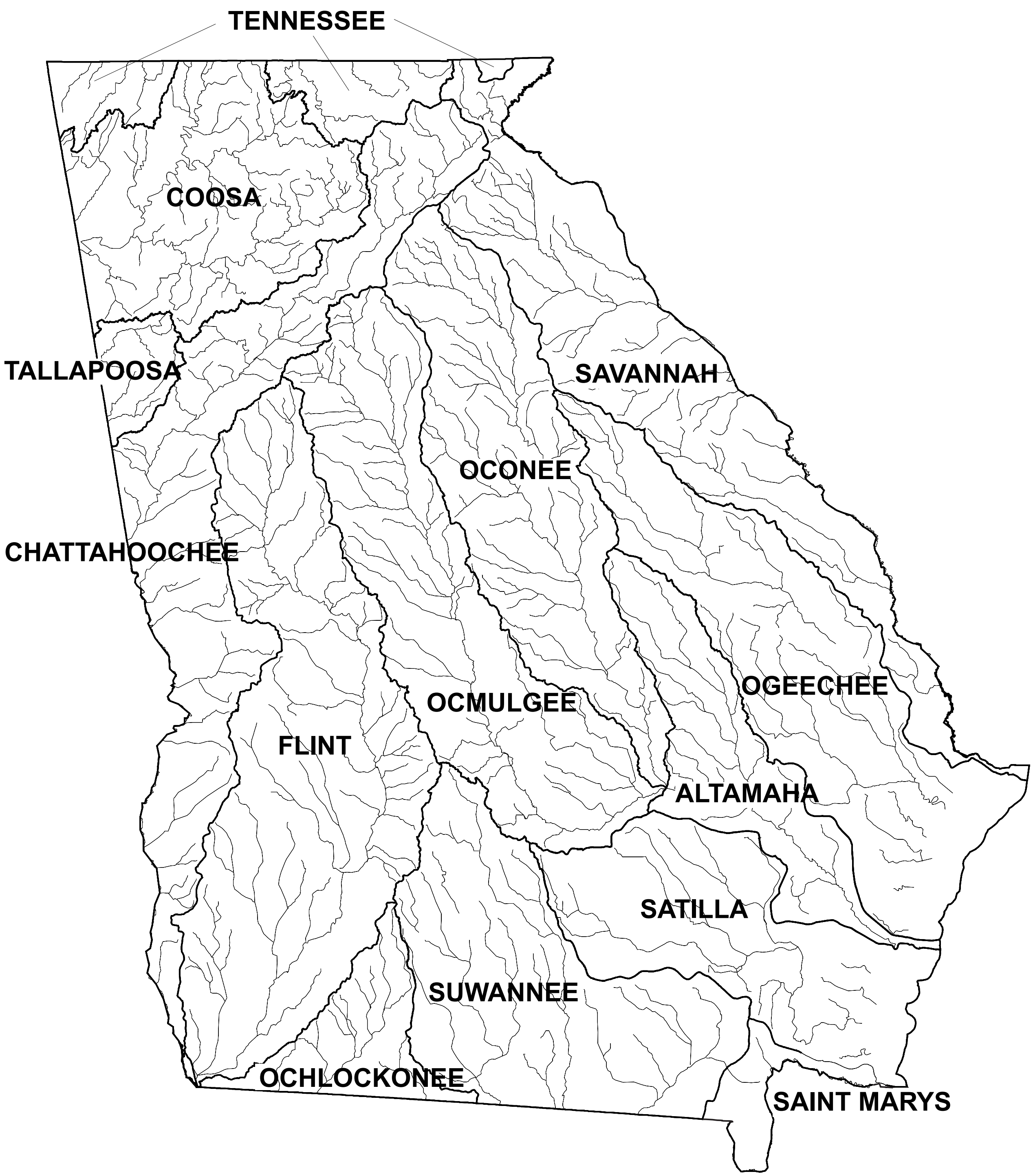

Figure 1-4. Major River Basins in the State of Georgia

- Provide opportunities for intergovernmental resource sharing.
- Improve spatial detail of water quality assessments resulting from increased monitoring coverage within river basins (a set of core trend monitoring sites will be maintained statewide).
- Improve basic knowledge of the watershed as well as cumulative impacts within a watershed.
- Provide a framework for centralized data management.
- Improve opportunities for management strategy implementation by increasing stakeholder involvement within the watershed.
- Provide consistent and integrated decision making for water resource issues.

1.2.2.2 RBMP Cycle

A RBMP cycle (Figure 1-5) has been developed to provide the process for the development and implementation of river basin management plans. The RBMP cycle consists of 12 steps organized into five phases designed to develop and implement RBMP over a five year period. The objectives of the individual cycle steps are described below.

1. Organize River Basin Advisory Committee. Public participation or stakeholder involvement is an important aspect of the program. The river basin management planning law requires the Director of EPD to appoint at least seven citizens and a chairman to a local advisory committee to provide advice and counsel to the Director during the development of the management plans.

In addition to the local advisory committee, basin stakeholders will be encouraged to participate in developing and implementing the river basin management plan. EPD will host meetings to familiarize the stakeholders with the progress of the individual basin plans and seek input on issues and actions at important points in the planning process.

2. Review River Basin Management Goals and Objectives. The overall Mission, Goals, and Objectives for RBMP were drafted by EPD in 1993. In January, 1994, EPD hosted a combined meeting of the local advisory committees for the Chattahoochee, Flint, Coosa, and Oconee River basins for the purpose of reviewing and reaching consensus on the Mission, Goals, and Objectives. These goals and objectives will be reviewed in the initial steps of each basin planning cycle and goals and objectives specific to the individual basin may be added.

**Stakeholder Involvement* will be encouraged at this point in the cycle to introduce RBMP and receive information and comments from all interested stakeholders, and to solicit input on water resource and monitoring issues in the river basin. The major objective of this initial stakeholder meeting is to encourage early involvement in the RBMP process.

3. Compile and Review Preliminary Information/Data. Readily available information and data will be compiled and analyzed to begin characterizing each river basin. This initial information and data review will help identify deficiencies in the available information, and provide input to the strategic monitoring plan and future RBMP activities.

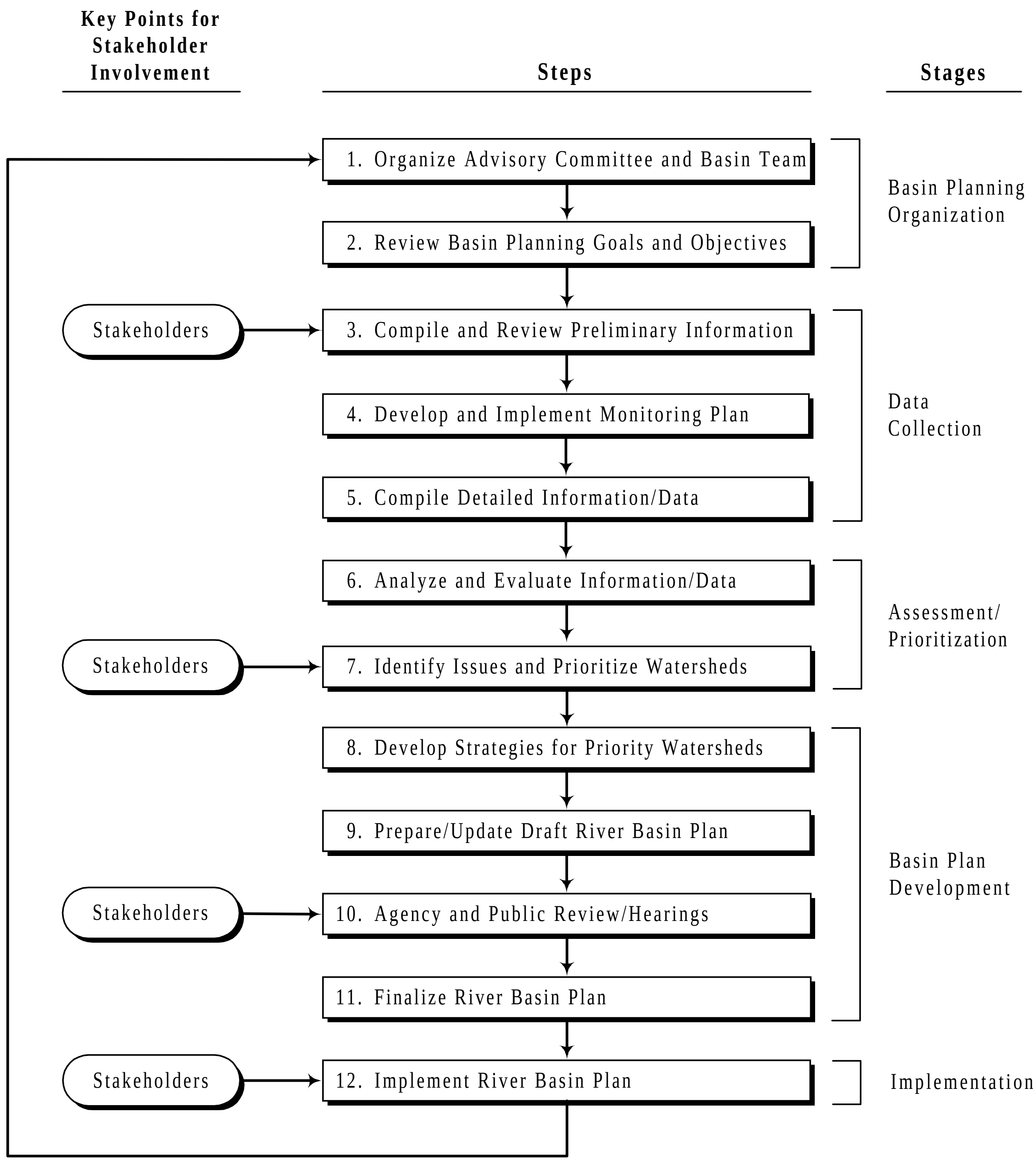

Figure 1-5. Georgia River Basin Management Planning Cycle

4. Develop and Implement Monitoring Plan. A strategic monitoring plan will be implemented to collect data to characterize basin water quality and quantity, and monitor the effectiveness of river basin management actions or implementation strategies. The monitoring plan will be developed based on watershed units, review of preliminary information/data, and stakeholder recommendations. The plan will describe the objectives and strategy including specific station locations, water quality parameters, and sampling frequency.

Some water resource issues may require detailed assessments to evaluate the magnitude and define causal relationships. Such detailed assessments or intensive surveys, may include water availability and use studies, assimilative capacity studies, Total Maximum Daily Load (TMDL) evaluations, or use attainment studies.

5. Compile Detailed Information/Data. Existing information and data of varying types will be available for each basin. EPD will use its information resources and databases, and request information from other agencies, organizations, and stakeholders where appropriate. Information and data will be sought for basin characterization (e.g., land use, hydrology, water availability, population and demographics, water supply demand, economics, water quality, resource management). Information and data collected for each river basin may be entered into databases and GIS coverages to facilitate its long-term management.

6. Analyze and Evaluate Information/Data. Analysis of basin wide monitoring data and stakeholder information will focus on issue identification and resource management strategies. Information and data limitations will be identified so that initial findings can be appropriately qualified. Some assessment and quantification of water availability and use requirements, loading estimates, and assimilative capacity may be performed to develop causal relationships.

7. Identify and Prioritize Issues. Water resource issues identified during the initial stakeholder involvement and those identified during the monitoring, information/data collection, and analysis will be prioritized according to need for additional action. Some priority issues identified during the RBMP process may require additional study to facilitate decision making. A variety of assessment tools including Clean Water Act Sections 305(b) and 303(d)-related procedures will be used to identify priorities.

**Stakeholder Involvement* will be encouraged at this point in the RBMP cycle to receive input on the water resource issues and priorities.

8. Develop Strategies For Priority Issues. EPD will propose strategies to address the issues identified in the river basin. Potential strategies include water supply alternatives, point source and nonpoint source controls, best management practices, stormwater management, erosion and sediment control, and habitat restoration. Where applicable, strategies will be evaluated for their effectiveness in achieving water resource goals using predictive modeling or other methods. Regulatory constraints and procedures will be considered and stakeholder cooperation will be encouraged where voluntary efforts are needed to meet water supply and water quality goals.

9. Prepare/Update Draft River Basin Plan. EPD will prepare a draft river basin management plan documenting the results of the planning process including a comprehensive basin characterization including information on data collected, analyses results and the methods used, issue identification and prioritization, water resource management goals, and management and implementation strategies. For successive river basin management plans, the existing plan will be updated to reflect plan progress and changing conditions in the river basin.

10. Agency and Public Review/Meetings. The draft river basin management plan will be distributed to the local advisory committee, the governmental partners, and made accessible to interested stakeholders. Stakeholder meetings will be conducted to explain the content of the river basin management plan and to solicit stakeholder comments and recommendations to the plan.

**Stakeholder Involvement* will be encouraged at this point in the RBMP process to obtain comments and recommendations on the plan.

11. Finalize River Basin Plan. Appropriate modifications will be made to the draft river basin management plan based on the comments and recommendations received during the review process. The final plan will be reviewed and adopted by the Board of the Georgia Department of Natural Resources.

12. Implement River Basin Management Plan. The RBMP cycle concludes by initiating implementation of management strategies. Potential activities during this period will include National Pollutant Discharge Elimination System (NPDES) point source and stormwater permitting activities, surface water and groundwater withdrawal permitting, nonpoint source best management practices implementation, voluntary self-monitoring programs, adopt-a-stream programs, habitat protection or enhancement, compliance monitoring, and enforcement actions. EPD will consider implementation strategies that are both within its regulatory capacity, and those that will be voluntary.

**Stakeholder Involvement* will be encouraged to support and implement the river basin management plan strategies. Some management strategies may be voluntary and their successful implementation can only be achieved by the appropriate stakeholders.

1.2.2.3 River Basin Groups and Planning Schedule

The major river basins previously described have been organized into five groups for RBMP. Grouping was necessary to accomplish the following:

- Complete river basin management plans for each major river basin in a timely manner.
- Repeat RBMP activities in each basin every five years.
- Coordinate NPDES permitting (including wasteload allocations) which has a five year renewal period.

The five river basin groups are shown in Figure 1-6 and are: Chattahoochee-Flint, Coosa-Tallapoosa-Tennessee, Oconee-Ocmulgee-Altamaha, Savannah-Ogeechee, and Suwanee-Satilla-Ochlockonee-Saint Marys. These river basin groups were determined based on river basin location, contributing drainage, physiographic features, and related water resource issues. The basin groups are critical to the scheduling of RBMP efforts.

A schedule (Figure 1-7) has been developed to complete plans for each major river basin and to establish a long-term basin planning process involving detailed reassessments of each river basin on a five year rotating basis. For instance, the initial Chattahoochee and Flint River basin plans will be completed in 1997. These basins will be reassessed beginning in 1999 with the process culminating in updated plans in the year 2003. Similarly, plan implementation for each river basin will be based on a rotating schedule. This approach will provide needed long-term perspectives and a defined schedule. This is a key issue, since the long-term, defined schedule offers the opportunity for many governmental agencies and stakeholders to plan partnerships and participation in the planning and implementation processes.

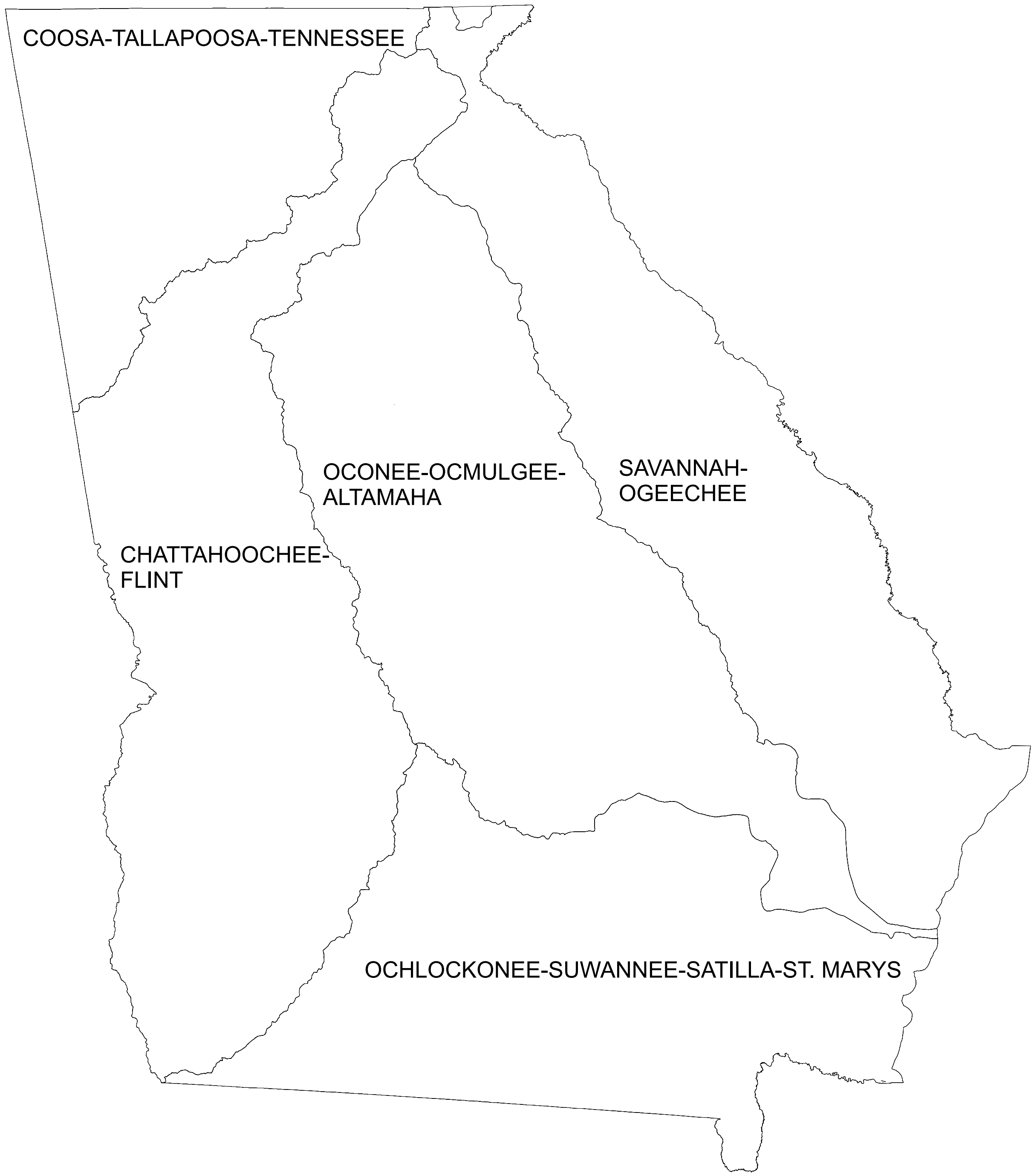

Figure 1- . Major River Basin Grou s for River Basin Manage ent P anning in Georgia

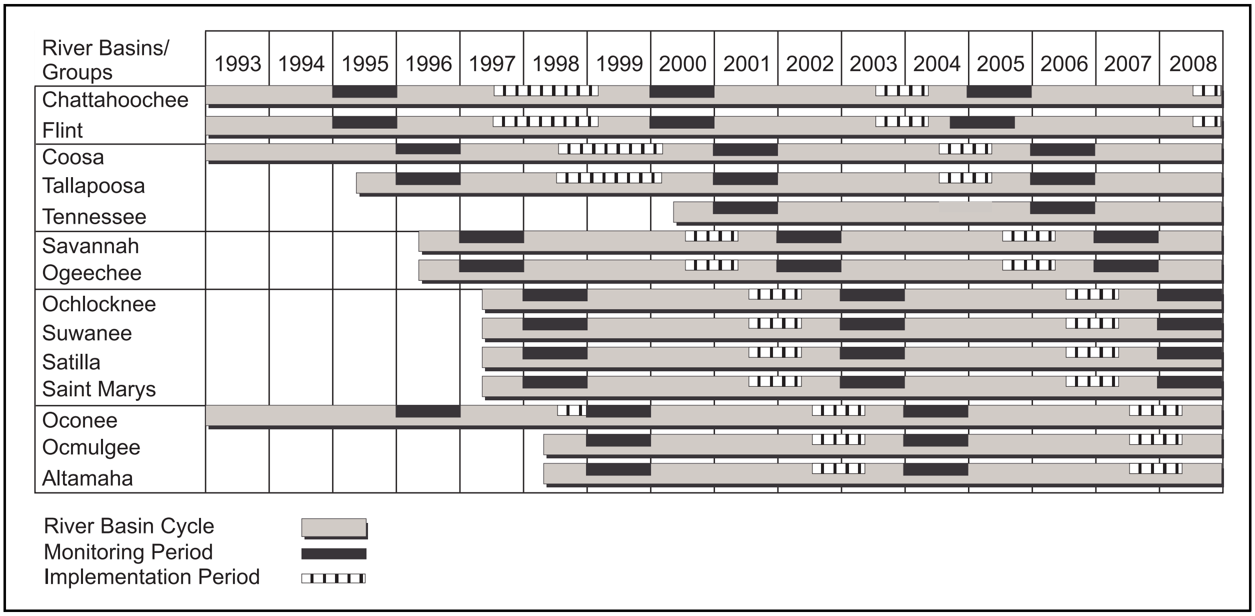

Figure 1-7. Georgia River Basin Management Planning Schedule

The initial scheduling process was influenced by several issues. First, the State law requires plans for the Coosa and Oconee River basins, which are in different basin groups (as previously defined), be the second set of plans to be started. Second, there is a significant opportunity to coordinate Georgia's RBMP work with the ongoing Tri-State (Alabama, Florida, Georgia)/U. S. Army Corps of Engineers (USACE) Comprehensive Study of the Alabama-Coosa-Tallapoosa and Appalachicola - Chattahoochee - Flint (ACT-ACF) basins which involves the Chattahoochee, Flint, Coosa, and Tallapoosa River basins. Thus, the Tallapoosa River basin plan is scheduled with the Coosa and Oconee River basin plans. However, program resources are not adequate to develop plans for the Tennessee, Ocmulgee, and Altamaha River basins at the same time. Third, an additional objective is to coordinate planning work with South Carolina on the Savannah River basin. In addition, the USACE, in coordination with other Federal agencies, is proposing a Comprehensive Study of the Savannah River basin which would commence in 1997. Thus, the schedule places the Savannah and Ogeechee River basins in the rotation beginning in 1996. Scheduling Georgia's RBMP to coincide with these other basin initiatives provides opportunities for resource, data, and information sharing.

As shown in the schedule, the program will converge into a long term rotating schedule. The schedule also shows that in a few years RBMP will be ongoing in all the major river basins in Georgia.

1.2.2.4 Forums for Involving Stakeholders in RBMP

A major goal of RBMP is to involve interested citizens and organizations in plan development and implementation. This is intended to improve the identification and prioritization of water quality and quantity problems, maximize the efficient utilization of resources and expertise, create better and more cost-effective management strategies, and be responsive to stakeholder perceptions and needs. Figure 1-8 shows the interactions between various stakeholder bodies in the RBMP process. The following paragraphs discuss the opportunities for stakeholder involvement in river basin management planning.

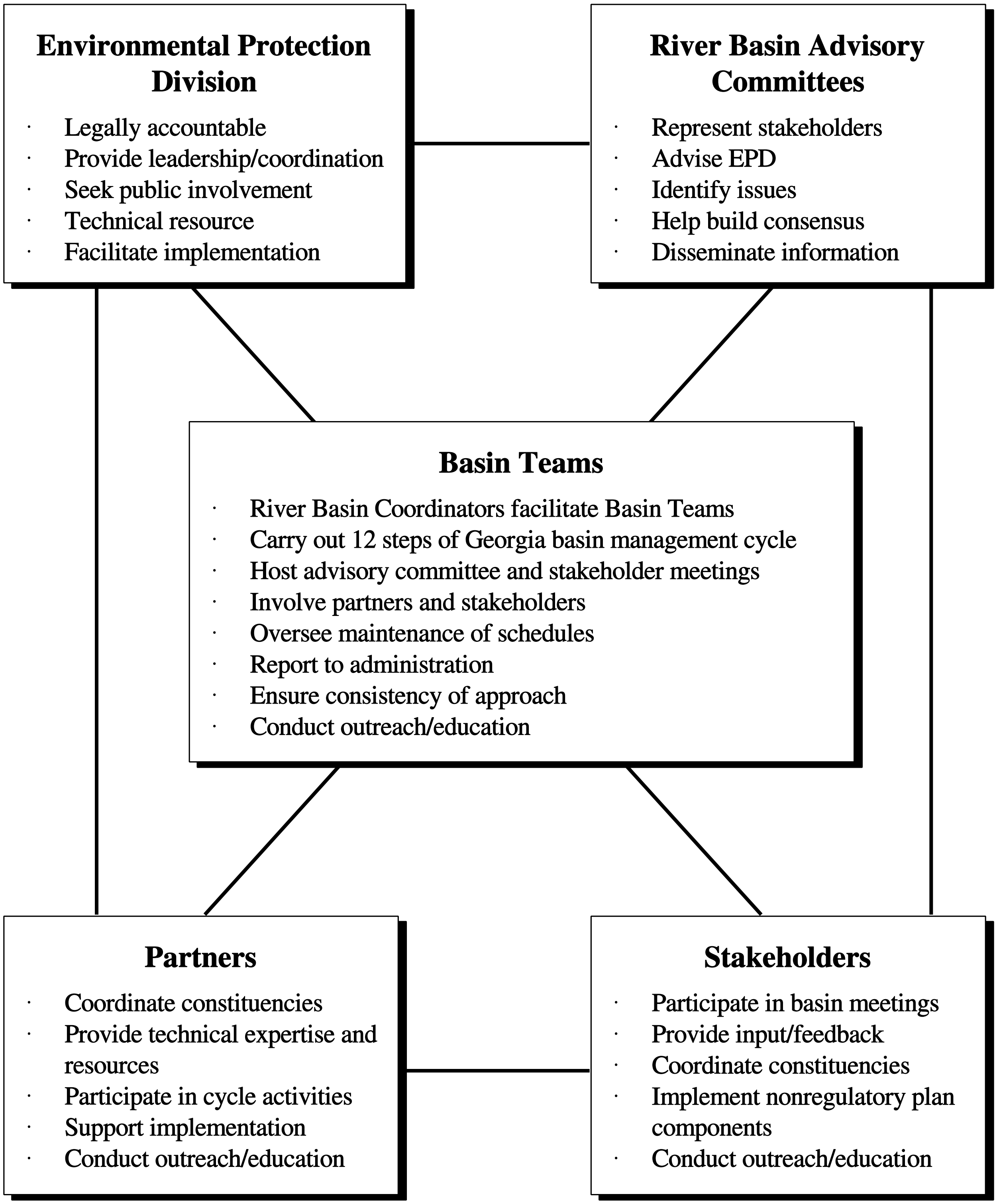

Figure 1-8. Stakeholder Relationships for Georgia River Basin Planning

A basin team will be assigned to each major river basin group (during step 1 of the basin cycle) and represents a core group of agencies and staff responsible for developing river basin management plans and implementing other components of RBMP. The Basin Team is directly responsible for carrying out the 12 steps of the basin planning cycle. Activities of the team are coordinated and facilitated by the two basin coordinator staff positions within EPD. Members of the basin team are selected from EPD programs and branches, Wildlife Resources Division and other interested governmental partners (e.g., Georgia Soil and Water Conservation Commission, USDA Natural Resources Conservation Service, Georgia Forestry Commission, etc.). Emphasis is placed on technical knowledge, available resources, and potential implementation responsibilities. There is an opportunity for non-agency groups, such as Regional Development Centers, to become a part of basin teams. Other groups and agencies may act as partners in the RBMP process, contributing resources and expertise, while not being directly involved in Basin Team activities.

River Basin Advisory Committees, providing advice and counsel to EPD during river basin management plan development, represent a forum for involving local stakeholders. These local advisory committees form a link between EPD and the regulated community and local watershed interests. The committees consist of at least seven people representing a variety of stakeholder interests including local governments, agriculture, industry, forestry, environmental groups, land-owners, and citizens. The committees are appointed at the beginning (step 1) of each river basin planning cycle, meet periodically during the planning cycle, and provide advice and counsel to EPD in the creation of river basin management plans. Meetings are called at the discretion of the chairman of the local advisory committee, and all meetings are open to the public.

While River Basin Advisory Committees operate at the major basin level, there is an opportunity under RBMP for more localized stakeholder forums to play an important role in the creation and implementation of water resources management strategies. Some strategies, such as best management practices (BMPs) to control pollutant runoff from urban, agricultural or forestry areas, are best managed at the city, county, or sub-watershed level. These local forums might already exist in the form of conservation districts or watershed associations, or may be created as an outgrowth of RBMP.

Finally, the RBMP approach includes regularly-scheduled stakeholder meetings, which provide the opportunity for the general public to learn about the status of water-related issues and management activities in their river basin, as well as contribute input that can influence basin management planning.

1.2.3 Key Benefits of RBMP

RBMP is designed to coordinate aquatic ecosystem management within river basins by integrating activities across regulatory and non-regulatory programs. The RBMP approach provides the framework for identifying, assessing, and prioritizing water resources issues, developing management strategies, and providing opportunities for targeted, cooperative actions to reduce pollution, enhance aquatic habitat, and provide a dependable water supply. RBMP will provide opportunities for stakeholders in the State’s river basins to participate in the development of river basin management plans. These plans will benefit from the collective experience and combined resources of a variety of stakeholders. By adopting a watershed protection approach, the Georgia will be changing the focus of its water resources management activities.

RBMP is not a new regulatory program, but rather a framework for improving the coordination and operation of existing regulatory and non-regulatory programs for increased environmental benefit and more efficient use of water resources. This is being achieved through organizational changes as well as changes in the focus of staff activities. For example, the Water Protection Branch of EPD is modifying the implementation of its regulatory and non-regulatory activities according to RBMP. There will be a changing focus of staff activities from strictly site-based approaches (i.e. individual discharger, water body) and program-based approaches (i.e. permits, inspections), to more holistic and integrated approaches. RBMP will help to focus the activities of existing regulatory and non-regulatory programs on recognized priority issues within a river basin.

The RBMP program has several features that represent either improvements in the implementation of existing regulatory and non-regulatory programs or new methods for accomplishing water resources management goals. These include:

- *Focus on Watersheds*: A key feature of RBMP is the focus on watersheds to improve the efficiency of State water resources programs by consolidating activities such as monitoring programs, modeling studies, permit public notices, and public meetings within a river basin. Focusing on watersheds will encourage agencies to seek information on all significant issues, and recognize connections in their management roles and responsibilities.

- *Stakeholder Involvement*: RBMP will provide a framework for linking local, state, and federal water resources management efforts throughout the State. RBMP focuses on a watershed, goals, and approaches for the watershed. Successful management therefore depends on the participation of those involved in or affected by such management decisions. The RBMP approach uses cooperative forums (i.e., basin teams, local advisory committees, public meetings) to involve stakeholders, promoting awareness of water related issues and encouraging stakeholders to respond.

- *Environmental Objectives*: RBMP focuses on achieving environmental objectives such as water quality standards and ecological goals. Management success will be evaluated by the progress made toward protecting or restoring specific waters from threats to human health and aquatic life, rather than program activities such as the number of permits issued or samples collected. In other words, RBMP is resource-based rather than program-based.

- *Priority Issues*: RBMP places monitoring and assessment at the forefront of the management process to better identify priority issues within watershed. Geographic targeting methods will be used to provide an objective and rational approach to prioritizing issues and watersheds, as well as targeting resources cost-effectively to address priority issues.

- *Integrated Solutions*: RBMP provides the framework for the expertise and resources of multiple stakeholders to be combined and applied more effectively. RBMP leverages personnel and financial resources to achieve watershed management goals and objectives by connecting basin activities.

- *Resource Protection Options*: RBMP is comprehensive in considering the interacting sources of environmental stressors within a given watershed. Increasing the diversity of stakeholders involved in RBMP will increase the resources and management capabilities to address priority issues within a river basin.

- *Improved Decision Making*: RBMP improves decision making in a variety of ways. First, it improves the scientific basis for management decision-making through multi-disciplinary assessment of a broader base of scientific information. This capability will be enhanced as the use of improved technologies, including geographic information systems (GIS) and database management, become more prevalent. Second, focusing on watersheds will encourage agencies to seek information on all significant stressors. Combining the experience, resources, and data of multiple stakeholders will increase the amount and types of information and data available for the assessment and prioritization of issues and resource management decisions.

- *Continuity and Consistency*: RBMP helps to reduce the tendency of regulatory programs to operate in a reactive or crisis mode by focusing on the watershed goals to be achieved during basin planning cycles. RBMP's iterative structure provides for updating priorities and management strategies. Successive updates of management plans can build on preceding efforts, adding continuity to watershed management. Such continuity provides stakeholders with a stronger foundation for long-term planning, and greater incentive to get involved. Improved consistency is possible because pollution sources across a river basin are evaluated simultaneously and management actions are subject to broad scrutiny during the planning process. Finally, implementation of comprehensive management strategies throughout a river basin promotes consistency.

1.2.4 Making the Transition to RBMP

RBMP is being phased into the activities of EPD to allow time for the approach to mature. During the transition period in moving from a program-based to resource-based approach, technical and administrative procedures will be developed and refined as the coordinating framework becomes established. New information management needs and solutions will be encountered, and not all of the features of RBMP described in the framework document will be implemented immediately. Synchronizing activities within basin management cycles will be dependent on the evolution of administrative procedures that define operation under RBMP.

A great deal of time and effort will be needed to develop the RBMP infrastructure to support initial development of river basin management plans. As a result, initial plans may not be as detailed, and are unlikely to address every issue in all basins. Resource constraints will exist; however, the RBMP schedule will be maintained with the understanding that priorities not addressed in one cycle can be considered in the next cycle. The cyclic nature of RBMP is based on the premise that basin management is a dynamic process and management plans will evolve over time providing for updated assessments, priorities, management plans, and implementation strategies every five years.

1.3 Chattahoochee Basin Planning Schedule and Opportunities for Stakeholder Involvement

1.3.1 RBMP Activities

Figures 1-9 and 1-10 show the Chattahoochee River basin management planning schedule of activities for the first two cycles: i.e., 1993-1999 and 1999-2004. The Chattahoochee basin was one of the first four basins (along with the Flint, Oconee, and Coosa basins) to begin the RBMP cycle in 1993. As discussed in section 1.2.2.3, initial scheduling complications and the need to devote resources to development of the RBMP infrastructure have caused the first basin cycle to be somewhat condensed. In the Chattahoochee basin, this has meant that there was not as much time available in the first cycle (1994-1999) to prioritize watersheds and develop management strategies (steps 7 and 8) as there will be once the program converges into a long-

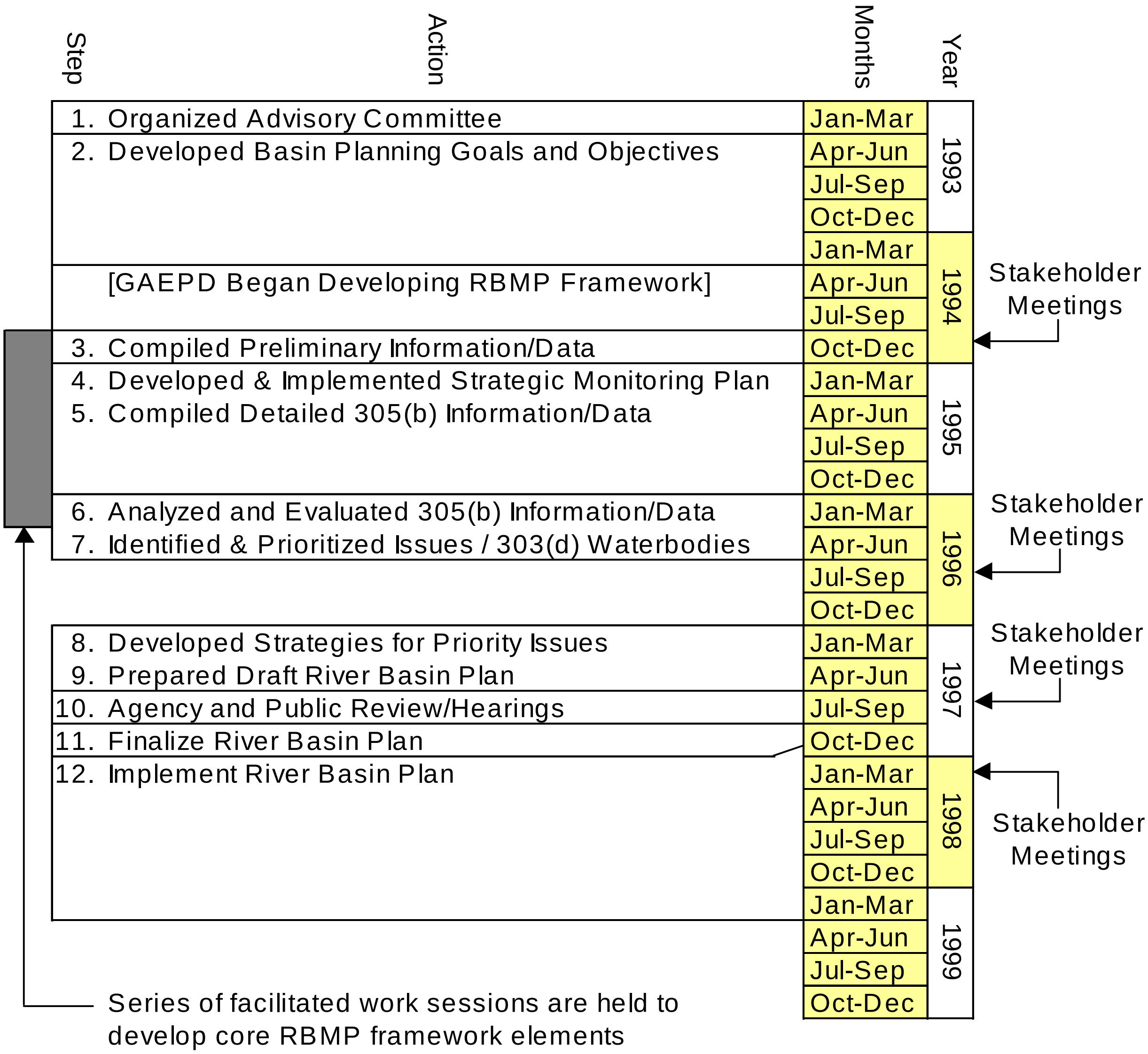

Figure 1-9. Chattahoochee River Basin Planning Schedule, 1993-1999

term rotating cycle (after 1999). Also, the implementation stage of the first cycle (step 12 in Figure 1-9) is prolonged in order to bring the basin cycle into phase with the long-term rotating cycle, which has the Chattahoochee basin planning cycle beginning in April of 1999 (and every five years thereafter). During the implementation phase the local advisory committee will meet periodically and work to expand and broaden participation by stakeholders in the implementation of action plan items.

This prolonged implementation phase provides an opportunity for the Chattahoochee River basin team and local advisory committee to conduct further outreach activities in order to educate stakeholders about the changes and new opportunities under RBMP. Also, the local advisory committee may wish to use this time to involve stakeholders in a discussion of possible water resources management strategies and the development of infrastructure to support these

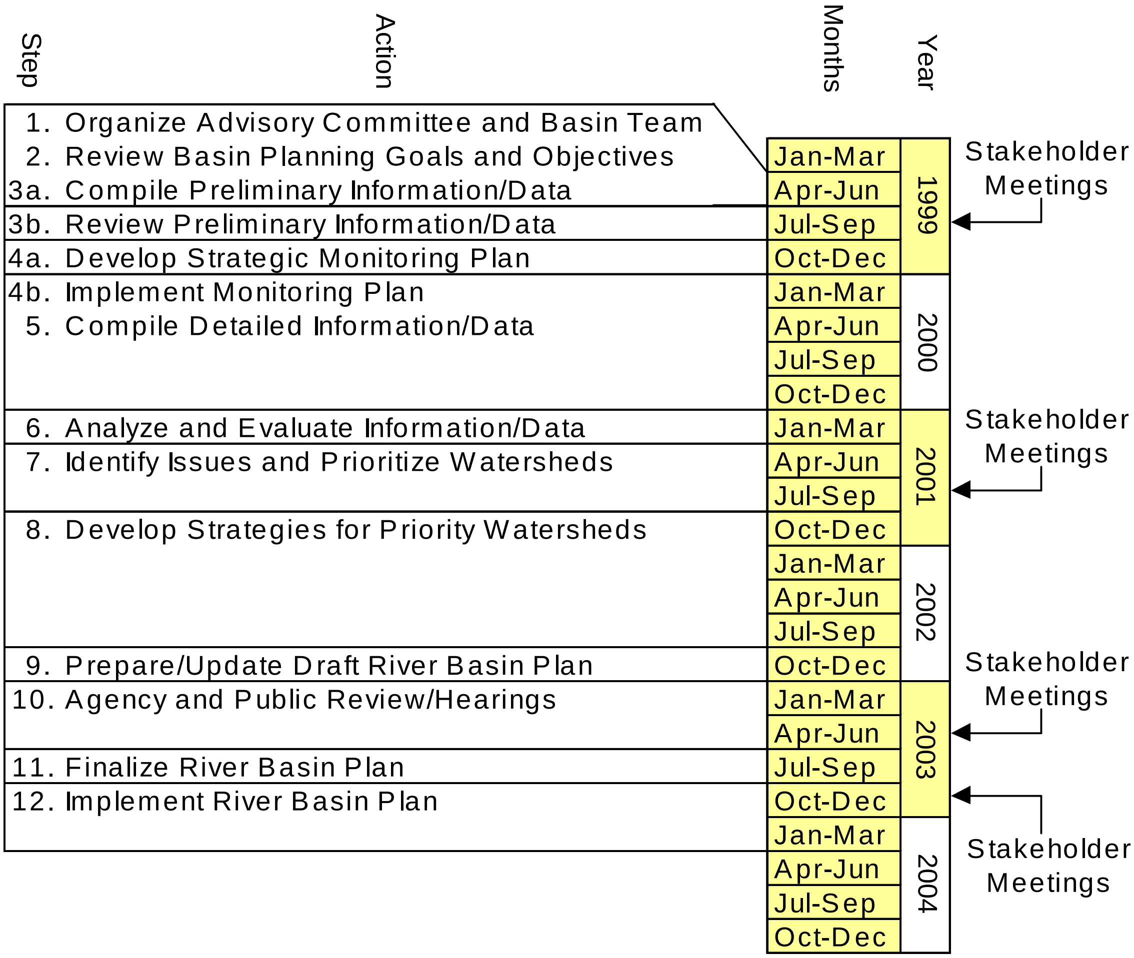

Figure 1-10. Chattahoochee River Basin Planning Schedule, 1999-2004

strategies. For example, this might be a good time to organize small local stakeholder forums that will support the implementation of management strategies (like BMPs) in the next RBMP iteration. EPD considers stakeholder involvement as a continuous process, not limited to scheduled meetings, and encourages stakeholders to provide input and assistance at any time.

It is a basic premise of RBMP that river basin management is more efficient and effective when stakeholders—government agencies, local governments, farmers, industries, landowners, environmentalists, etc.—participate in the process, and share knowledge and resources. One purpose of this river basin management plan is to encourage involvement of interested stakeholders in the RBMP process. The following paragraphs describe ways in which individuals, organizations, or governmental bodies may become more involved in future river basin planning for the Chattahoochee Basin.

As shown in Figure 1-5, every basin planning cycle begins with the organization of the basin team. Figure 1-10 shows that the Chattahoochee River basin team will be re-organizing itself in April to June of 1999. This is an opportunity to review basin team membership and recruit any new members that can contribute significant resources and expertise to the planning process.

The local advisory committee will also be re-organized during this same time period; if it is perceived that certain stakeholder interests have not been well-represented, this is an opportunity to adjust the membership of the committee. The current members of the Chattahoochee River Basin Advisory Committee, and the stakeholder interests they represent, are listed in Figure 1-11.

Figures 1-9 and 1-10 show the timing of stakeholder meetings that have been and will be held as part of the Chattahoochee basin RBMP cycles. The specific purposes of each stakeholder meeting are described above in section 1.2.2.2, and indicated in Figure 1-5. The first two groups of stakeholder meetings have already been held for the current planning cycle. EPD hosted initial stakeholder meetings in Helen, Atlanta, and Columbus in late 1994 to invite and encourage stakeholder input early in the planning process for the Chattahoochee River basin. Second stakeholder meetings were held in Helen, Atlanta, and Columbus in 1996 to discuss water quality assessment results, problem areas, and prioritization of actions to address problem areas. A third group of stakeholder meetings—to give stakeholders the opportunity to review this river basin management plan—were held in Helen, Atlanta, and Columbus in September, 1997. A fourth group of meetings in 1998 will give stakeholders a chance to discuss implementation of management strategies. The next group of stakeholder meetings will be held in late 1999, providing stakeholders an opportunity to be involved in the planning for the next cycle of focused water quality monitoring in the Chattahoochee basin. The dates of ensuing stakeholder meetings are indicated in Figure 1-10.

1.3.2 ACT/ACF Comprehensive Study

In 1990 the State of Alabama, concerned about the availability of water for its future needs, filed suit in U.S. District Court to prevent the Corps of Engineers from reallocating water from Lakes Lanier, Carters, and Allatoona to increase the water supply for metropolitan Atlanta; Florida later joined this suit. Under a letter of agreement signed by the three states and the Corps, the ACT/ACF (Alabama- Coosa-Tallapoosa/ Apalachicola-Chattahoochee-Flint) Comprehensive Study was initiated in 1991. During the spring of 1997 the three state legislatures approved separate Interstate Compacts which establish the legal and functional basis for future management of the ACT and ACF basins. Congress will consider these compacts in 1997.

Although neither Compact contains a specific allocation of water for the states, this will be the first consideration of the Commissions when they are established. In fact, there is a provision in the compacts which requires that allocations be developed before the end of 1998. Obviously the allocation for the ACF Basin will have a potentially significant effect on water resource planning in the Chattahoochee and Flint basins in Georgia. It is expected that the allocation will establish some form of a commitment for Georgia to allow certain quantities of water to pass downstream for use by Alabama and Florida. Such a commitment will not establish how the water must be used within Georgia; those decisions will remain the prerogative of Georgia’s governments and citizens. However, it is possible that there may be limitations on quantities of water which will be available for various uses in the Chattahoochee Basin. Although this potential constraint is recognized, this initial Chattahoochee River Basin Plan can not consider any specific water allocation limitation. Frequent reference is made to the ACT/ACF Study throughout this Plan where data, Study results, or potential Compact constraints may apply.

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Figure 1-11. Chattahoochee River Basin Local Advisory Committee Members.

Section 2

River Basin Characteristics

Effective management of the Chattahoochee River Basin starts with an understanding of the salient features of this geographic management unit. These provide the context, constraints, and opportunities for management actions. Important aspects include:

- *River basin characteristics* (Section 2.1): the physical features and natural processes of the basin, which determine how waters within the basin respond to conditions;
- *Population and land use* (Section 2.2): the sociological features of the basin, including the types of human activities which may impact water quality;
- *Local governments and planning authorities* (Section 2.3): identification and roles of the local authorities whose decisions may influence man's impact on water quality;
- *Water use classifications* (Section 2.4): the description in the state regulatory framework of best uses and baseline goals for management of waters within the basin.

2.1 River Basin Description

This section describes the important geographical, geological, hydrological, and biological characteristics of the Chattahoochee River Basin. It is largely adapted from Couch et al. (1996). Additional material is drawn from EPD (1996), and other sources.

The physical characteristics of the Chattahoochee River Basin include its location, physiography, soils, climate, surface water and ground water resources, and natural water quality. These physical characteristics provide the natural template which influences the basin's biological habitats, and the way in which people use the basin's land and water resources

2.1.1 River Basin Boundaries

The Chattahoochee River originates in the southeast corner of Union County, Georgia, within the Blue Ridge Mountains, and only about 12 miles from the Tennessee border (Figure 2-1). This figure, like many other figures in this section, shows the Chattahoochee basin in the context of the larger "ACF" basin, consisting of the Apalachicola, Flint and Chattahoochee river basins. From its origin, the river flows southwesterly, through the Atlanta metropolitan area, until reaching the Alabama border at West Point, in Troup County, Georgia From this point south, the Chattahoochee forms the border between Georgia and Alabama, and terminates in Lake Seminole, at the Georgia-Florida border for a total distance of about 434 miles. The Flint River basin also discharges to Lake Seminole. The outflow from Lake Seminole forms the Apalachicola River in Florida, which ultimately discharges to the Gulf of Mexico at Apalachicola Bay. The Chattahoochee River Basin or watershed, constituting all land areas draining into the river, occupies a total area of 8,770 square miles, of which 6,140 square miles (70 %) lie in Georgia, 2,574 square miles (29 %) lie in Alabama, and 56 square miles (1 %) lie in Florida. Water resources within the Chattahoochee River Basin are affected by runoff from all parts of the basin. This plan focuses on management of water resources within the Georgia

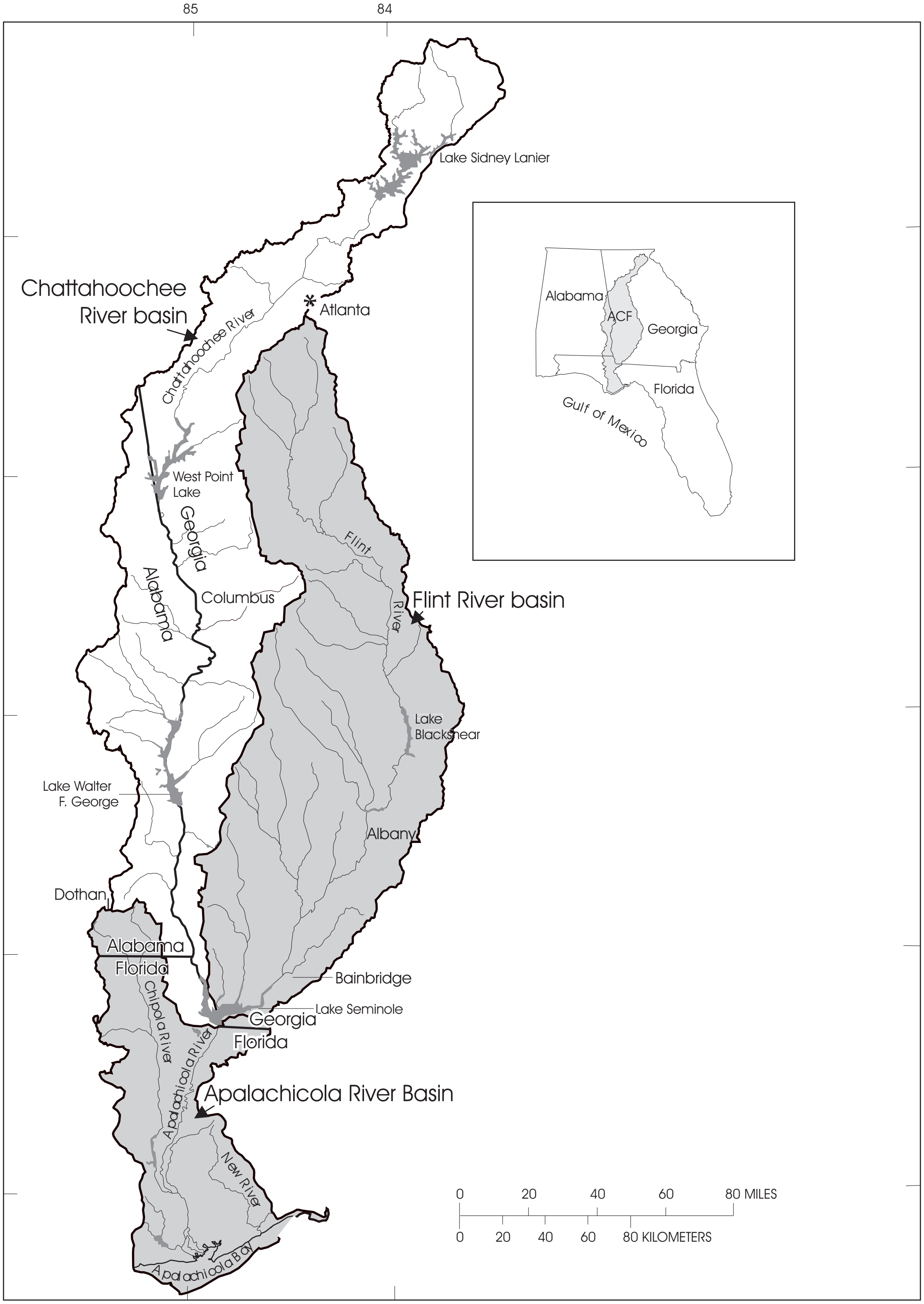


Figure 2-1. Location of the Chattahoochee River Basin within the Apalachicola-Chattahoochee-Flint River Basin (modified from Couch et al., 1996)

portion of the basin only. The plan benefits significantly from the basin coordination being accomplished through the ACT-ACF Comprehensive Study.

The USGS has divided the Chattahoochee basin into four sub-basins, or Hydrologic Unit Codes (HUCs; see Table 2-1). These HUCs are referred to repeatedly in this report to distinguish conditions in different parts of the Chattahoochee River Basin. Figure 2-2 shows the location of these sub-basins and the associated counties within each sub-basin.

2.1.2 Climate

The Chattahoochee River Basin is characterized by a warm and humid, temperate climate. Major factors influencing climate variability in the basin are latitude, altitude, and proximity to the Gulf of Mexico.

Because the Chattahoochee River Basin spans about 4 degrees of latitude, it has a sharp gradient in growing seasons. Average annual temperature ranges from about 60 ° F in the north to 70 ° F in the south. Average daily temperatures in the basin for January range from about 40 ° F to 55 ° F, and for July from 75 ° F to 80 ° F. In the winter, cold winds from the northwest cause the minimum temperature to dip below freezing for short periods. Summer temperatures commonly range from the 70's to the 90's.

Precipitation is greatest at the north end of the basin in the mountains, and at the south end near the Gulf of Mexico as a result of the availability of moist air. Average annual precipitation in the basin, primarily as rainfall, is about 55 inches (U.S. Geological Survey, 1986).

Evapotranspiration (the sum of direct evaporation and transpiration by plants) generally increases from north to south and ranges from about 32 to 42 in. of water per year. In the east-central part of the basin, precipitation and evapotranspiration are about equal. Average annual runoff ranges from 15 to 40 in. Areal distribution of average annual runoff from 1951-80 reflects basinwide patterns in precipitation and soil-runoff potential. Runoff is greatest in the Blue Ridge Mountains and near the Gulf coast (Gebert et al., 1987).

2.1.3 Physiography and Geology

The Chattahoochee River Basin contains parts of the Blue Ridge, Piedmont, and Coastal Plain physiographic provinces that extend throughout the southeastern United States. Similar to much of the Southeast, the basin's physiography reflects a geologic history of mountain building in the Appalachian Mountains, and long periods of repeated land submergence in the Coastal Plain Province.

Table 2-1. Hydrologic Unit Codes (HUCs) of the Chattahoochee River Basin

03130001	Upper Chattahoochee, from Headwaters to Peachtree Creek at Atlanta
03130002	Middle Chattahoochee, from Peachtree Creek to Oliver Dam near Columbus, GA
03130003	Middle Chattahoochee, from Oliver Dam to Walter F. George Lock and Dam above Fort Gaines, GA
03130004	Lower Chattahoochee, from Walter F. George Lock and Dam to Lake Seminole

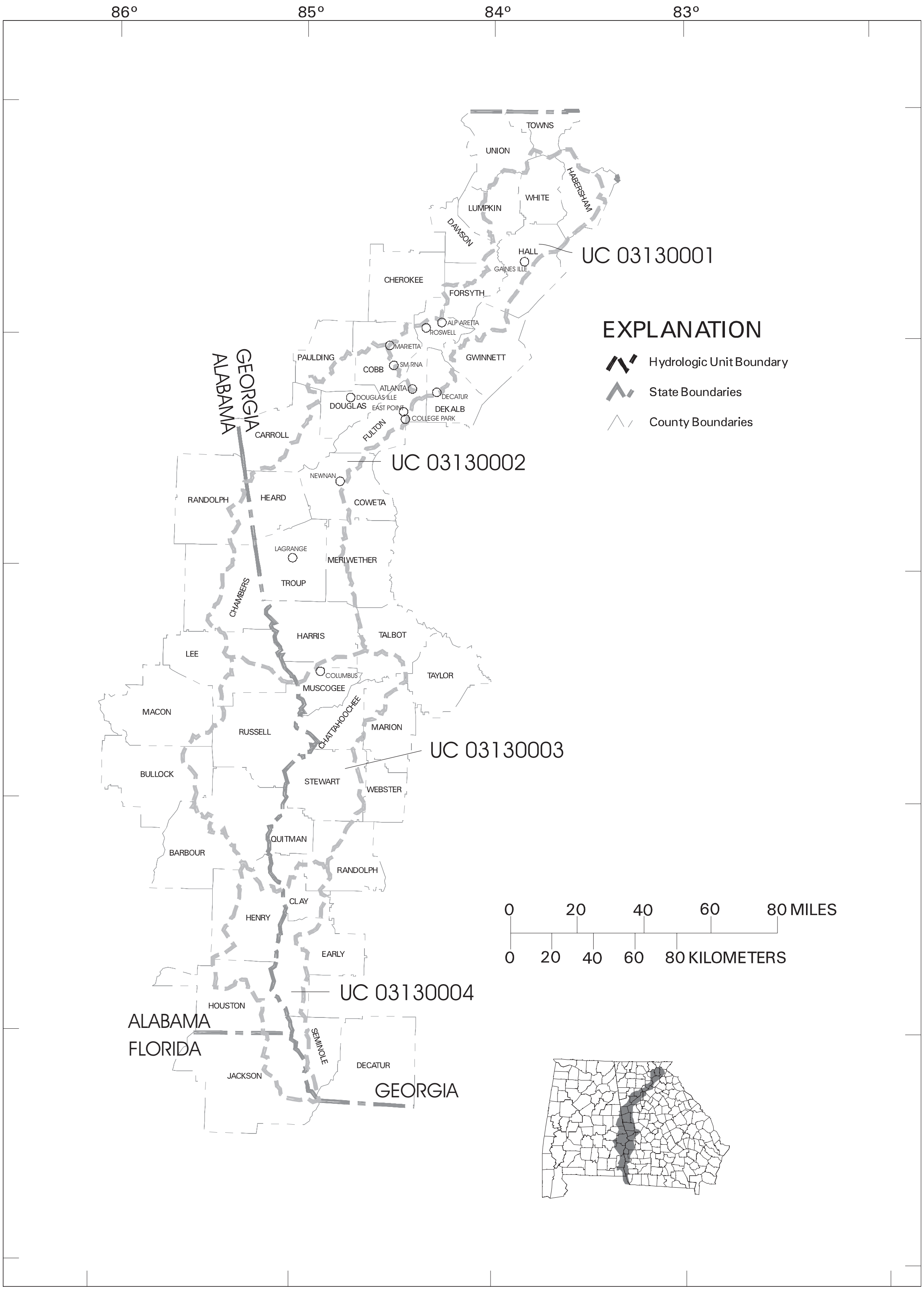


Figure 2-2. Hydrologic Units and Counties of the Chattahoochee River Basin

The northernmost part of the Chattahoochee River Basin is within the Blue Ridge Province where the headwaters arise. Less than one percent of the basin lies within the Blue Ridge Province. The Blue Ridge Province is dominated by rugged mountains and ridges that range in altitude from 3,000 to 3,500 feet (ft). Runoff is quite rapid because of the steep terrain and steep stream gradients in this province. The boundary between the Blue Ridge and the Piedmont is defined by a sharp change in slope at an altitude of approximately 1,700 ft. The Blue Ridge and Piedmont Provinces are underlain by mostly Precambrian and older Paleozoic fractured crystalline rocks that include mica schist, felsic gneiss and schist, and granite and granite gneiss. Less extensive outcrops of quartzites are also present. The crystalline rocks typically are overlain by a porous, residual soil generally known as saprolite.

The Fall Line is the boundary between the Piedmont and Coastal Plain Provinces. This boundary approximately follows the contact between crystalline rocks of the Piedmont Province and the unconsolidated Cretaceous and Tertiary sediments of the Coastal Plain Province. As implied by the name, streams flowing across the Fall Line can undergo abrupt changes in gradient which are marked by the presence of rapids and shoals. Geomorphic characteristics of streams differ between the Piedmont and Coastal Plain Provinces. In the Coastal Plain, streams typically lack the riffles and shoals common to streams in the Piedmont, and exhibit greater floodplain development and increased sinuosity (Wharton, 1978).

The Coastal Plain Province contains two distinct regions – a hilly region immediately below the Fall Line (Fall Line Hills District or Georgia Sand Hills); and a region of porous limestone or karst topography (Dougherty Plain District). The Fall Line Hills District is highly dissected with relief ranging 50-250 ft. Cretaceous sediments lie in a band immediately below the Fall Line and crop out into younger Eocene-Paleocene sediments of the low-lying Dougherty Plain District.

The Dougherty Plain District is characterized by outcrops of the Ocala and Suwannee Limestones that result in a karst topography. The Dougherty Plain slopes southwestward with altitudes of 300 ft in the northeast to less than 100 ft near Lake Seminole. The flat to very gently rolling topography contains numerous sinkholes and associated marshes and ponds. Small streams in the Dougherty Plain District are frequently intermittent during the summer.

Geology

The geology of the Chattahoochee River Basin strongly influences its physiography, geochemistry, soils, surface and ground water resources. The Chattahoochee River Basin in Georgia is underlain by older (Precambrian and Paleozoic) crystalline rocks in the northern 70 percent of the basin and by younger (Cretaceous and Tertiary) sedimentary rocks in the southern 30 percent of the basin. The crystalline rocks are predominantly gneiss (25 percent) and schists (19 percent) with lesser amounts of metamorphosed volcanic rocks (9 percent), metamorphosed sedimentary rocks (8 percent), and granites (4 percent). In the northern half of the basin, the course of Chattahoochee River is principally guided by a zone of intensely sheared and less resistant rocks created by movement along the Brevard Fault Zone, a major structure that extends from Alabama to Virginia. The Brevard Fault Zone marks the boundary between Blue Ridge geologic terrane to the northwest from the Inner Piedmont geologic terrane to the southeast. Rock units are generally aligned to the northeast parallel to regional structures that include the Brevard Fault Zone. In the southern part of the basin, the Chattahoochee River cuts across both resistant and less resistant rock units of the Piedmont and the Coastal Plain.

The Blue Ridge terrane contains several groups of rocks that contain predominantly metamorphosed volcanic rocks or metamorphosed sedimentary rocks. Rocks are mainly gneisses, schists, quartzites, and amphibolites. The type of rocks influence the stream drainage patterns, the type and geochemistry of the soils and sediments that are derived from those rocks, and the chemistry of the water that flows through and reacts with the rocks, soils and sediments. The metamorphosed volcanic rocks contain higher concentrations of metals and host the Dahlonega gold belt and the Carroll County gold belt. Metals include copper, zinc, arsenic, mercury, lead, nickel, molybdenum, and iron. Many of the metal ores are characteristically massive sulfides and weathering of these sulfides may increase stream acidity because of their high sulfide contents. Numerous small ultramafic rocks bodies in the northernmost part of the basin contain high concentrations of chromium, nickel, and asbestos. The metamorphosed sedimentary rocks generally contain lower concentrations of metals with the exception of the relatively small Hall County gold belt.

The Inner Piedmont terrane generally contains metamorphosed sedimentary rocks such as gneisses, schists and quartzites. Small granitic intrusions are found in the Atlanta area and are important sources of crushed stone. Amphibolitic rocks that represent a metamorphosed volcanic rocks are found in the southwestern part of the basin in and adjacent to Troup County. Higher concentrations of metals such as copper, zinc, lead and iron are associated with these amphibolites. Chromium-bearing ultramafic rocks are associated with the amphibolite. Beryllium-bearing pegmatites are also found in Troup County.

Deep weathering of Piedmont and Blue Ridge rocks produced a residuum referred to as saprolite. Saprolites may serve as local aquifers in these provinces. Soils are developed through weathering of the near-surface portions of the saprolite.

The southern third of the basin is underlain by Cretaceous and Tertiary sedimentary rocks of the Coastal Plain. These rocks are predominantly older sands and clays near the Fall Line and younger carbonate rocks in the southernmost part of the basin. These rocks dip gently on the order of a few tens of feet per mile to the southeast. Several important aquifers are associated with the more permeable rock units. Recharge areas for these aquifers are generally located where these rock units crop out in the northern part of the Coastal Plain. Rock composition and permeability have a strong influence on water that flows through them. Iron ores, kaolin, and bauxite are found and have been mined from the upper or northern part of the Coastal Plain.

Quaternary alluvium deposits are found in stream and river valleys with the larger and thicker deposits in the major river valleys. Commonly, these underlie the floodplains of the river systems.

Geochemistry

Background stream sediment and stream geochemistry of the Chattahoochee River Basin has been documented and analyzed by Cocker (in review) using data collected as part of the U.S. Department of Energy's National Uranium Resource Evaluation (NURE) program. Data was collected and analyzed for the period 1976 to 1978. The number of sample sites for this river basin is 1,133. Geochemical data included silver, aluminum, arsenic, barium, beryllium, cobalt, chromium, copper, iron, magnesium, manganese, nickel, lead, titanium, vanadium, zinc, pH, alkalinity, and conductivity. Additional supplementary rock geochemical data (including 396 samples from the Dahlonega district) collected by the U.S. Geological Survey in other studies are also documented and discussed in terms of the impact on stream geochemistry (Cocker, in review). Geochemical data were contoured and spatially related to specific rock units shown on the Geologic Map of Georgia (Georgia Geologic Survey, 1976) with the aid of a Geographical Information System (GIS).

The Chattahoochee River Basin cuts across five regions that differ in stream pH, conductivity and alkalinity and that are spatially coincident with regional geology and related stream sediment geochemical trends. Two regions have higher pH (greater than 7), higher conductivity (greater than 50 micromhos/cm), and higher alkalinity (greater than 0.3 meq/L) and separate regions of lower pH, conductivity and alkalinity. These parameters are important because they may affect or measure the amount of dissolved metals in the surface and ground water (Cocker, in review).

Stream sediments with anomalous metals appear to be spatially related to particular geologic units or mineralized areas. High aluminum, cobalt, copper, lead, nickel, silver, and zinc are related to a biotite gneiss in White and Lumpkin Counties. Anomalously high lead, copper, cobalt, nickel, and zinc that are found in Coweta, Fulton, Carroll, and Cobb Counties appear related to the Dahlonega and Carroll County gold belts and to unnamed mineralized areas in Coweta and south Fulton Counties. Spatial and statistical analyses indicate that most anomalous NURE geochemical data could be related to natural sources, although a few sample sites may be influenced anthropogenic sources (Cocker, in review).

Soils

Soils of the Chattahoochee River Basin are divided into four major land-resource areas (formerly called soil provinces), which generally reflect the physiographic provinces and are shown in Figure 2-3. The Southern Piedmont, Georgia Sand Hills, and Southern Coastal Plain land-resource areas cover 98 percent of the Chattahoochee River Basin.

Two major soil orders, ultisols and entisols, and more than 40 soil series are present in the Chattahoochee River Basin (Hajek et al., 1975; Perkins and Shaffer, 1977; Caldwell and Johnson, 1982). The Southern Piedmont land-resource area is dominated by ultisols. Ultisols are characterized by sandy or loamy surface horizons and loamy or clayey subsurface horizons. These deeply weathered soils are derived from underlying crystalline rock. Piedmont ultisol soils are acid, low in nitrogen and phosphorus, and generally lack the original topsoil. Topsoil erosion began with intensive cultivation of cotton in the 1800's (Wharton, 1978). Massive soil movement from historical agricultural practices resulted in sediment deposition in streams and waterbodies which continues to affect conditions today (Trimble, 1974).

Soils in the Southern Coastal Plain and the Georgia Sand Hills land-resource areas are derived from marine and fluvial sediments eroded from the Appalachian and Piedmont Plateaus. Ultisols are found throughout the Southern Coastal Plain, with the exception of some areas in the Sand Hills and Dougherty Plain where entisols locally are present. Entisols are young soils with little or no change from parent material and with poorly developed subhorizons. These soils are frequently infertile and dry because they are deep, sandy, well-drained, and subject to active erosion.

Basinwide patterns in soil leaching and runoff potential provide information on areas that may be susceptible to greater contaminant transport through infiltration or runoff. Maps of soil leaching and runoff potential have been constructed for soils in the Chattahoochee River Basin using data from the digital State Soil Geographic Database (STATSGO) of the U.S. Department

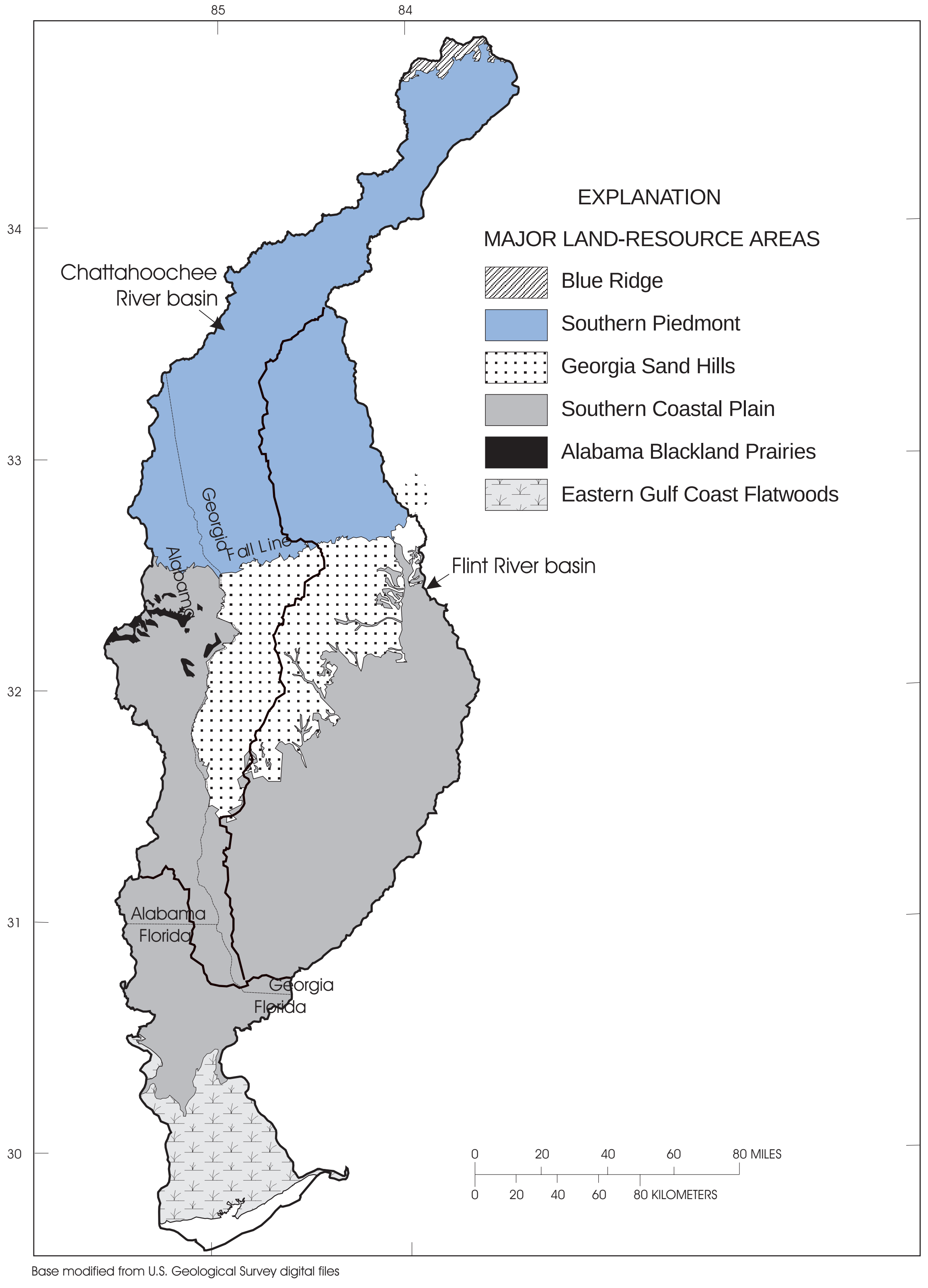


Figure 2-3. Major Land-Resource Areas in the Apalachicola-Chattahoochee-Flint River Basin (modified from Couch et al., 1996)

of Agriculture, Natural Resources Conservation Service (formerly called the Soil Conservation Service) (see Couch et al., 1996). A high leaching rate is assigned to soils with a permeability of 6.0 inches per hour or more (Brown et al., 1991). Soils with high leaching rates are concentrated in the sandy Cretaceous sediments south of the Fall Line.

Runoff ratings are based on the inherent capacity of bare soil to permit infiltration, and consider slope, frequency of flooding during the growing season, and permeability (Brown et al., 1991). Soils with high runoff ratings are distributed throughout the basin, but are concentrated in areas having low permeability, steep slopes; or where flooding is frequent or the water table is near the surface, such as in floodplains and other low-lying areas. In the Chattahoochee River Basin, soils with the highest runoff rate are present on steep slopes in the Blue Ridge, several areas in the Piedmont Province, and the Fall Line Hills District.

2.1.4 Surface Water Resources

The Chattahoochee River arises as a cold-water mountain stream in the Blue Ridge Province at altitudes above 3,000 ft and flows 430 mi to its confluence with the Flint River in Lake Seminole. The river drains an area of 8,770 mi^2 and is the most heavily used water resource in Georgia. Flow from 94% of the basin land area has been measured at the USGS gage station at Andrews Lock and Dam near Columbia, Alabama, with a drainage area of 8040 mi^2 (USGS gage 02343801). For the period from October 1975 through September 1996, the median or 50^{th} percentile daily flow at this station was 8,760 cubic feet per second (ft^3/s). Observed daily flows during this period ranged from a low of 498 ft^3/s (Jan. 29, 1989) to an estimated high of 195,000 ft^3/s (July 7, 1994), as summarized in Figure 2-4. The highest daily flow occurred during the passage of Tropical Storm Alberto on July 3-7, 1994, which resulted in record flooding on the Flint and Ocmulgee Rivers. The Chattahoochee River Basin did not receive as extreme rainfall as the Flint Basin, but 5-day total rainfall in parts of the lower Chattahoochee was in excess of 10 inches.

As discussed in Section 2.1.1, the Chattahoochee River Basin is subdivided into four Hydrologic Units (HUCs). Stream networks within the Georgia portions of each of these four HUCs are shown in Figures 2-5 through 2-8.

A longitudinal profile of the Chattahoochee River shows three concave segments that are separated by two nick or inflection points. The southern nick point is the Fall line near Columbus, and the northern nick point lies along the stretch of river from Roswell to Vinings. The gradient of the Chattahoochee River is steepest (11 to 22 feet per mile) from Helen to Cornelia and decreases to 2 to 5 feet per mile from Cornelia to Roswell. Gradients of 3 to 6 feet per mile are present from Roswell through the Atlanta area. Gradients decrease to 1 to 2 feet per mile from Atlanta to Franklin and are fairly constant from the Cornelia-Gainesville area to the West Point-Columbus area. A steep gradient of 9 feet per mile is developed at the Fall Line between West Point and Columbus. Gradient of the Chattahoochee River is lower (0.7 to 1 foot per mile) from the Columbus gage to its mouth. The Chattahoochee River is well-incised either into its floodplain or into rock where the floodplain is non-existent.

Thirteen dams are located on the main stem of the Chattahoochee River (Table 2-1, Figure 2-9), and the terminus of the Chattahoochee is also impounded by Lake Seminole, an impoundment of the Apalachicola River. Dam construction in the basin began in the early 1800's on the Chattahoochee River above the Fall Line at Columbus, Georgia, to take advantage of natural gradients for power production. Annual flow has not been appreciably altered by the system

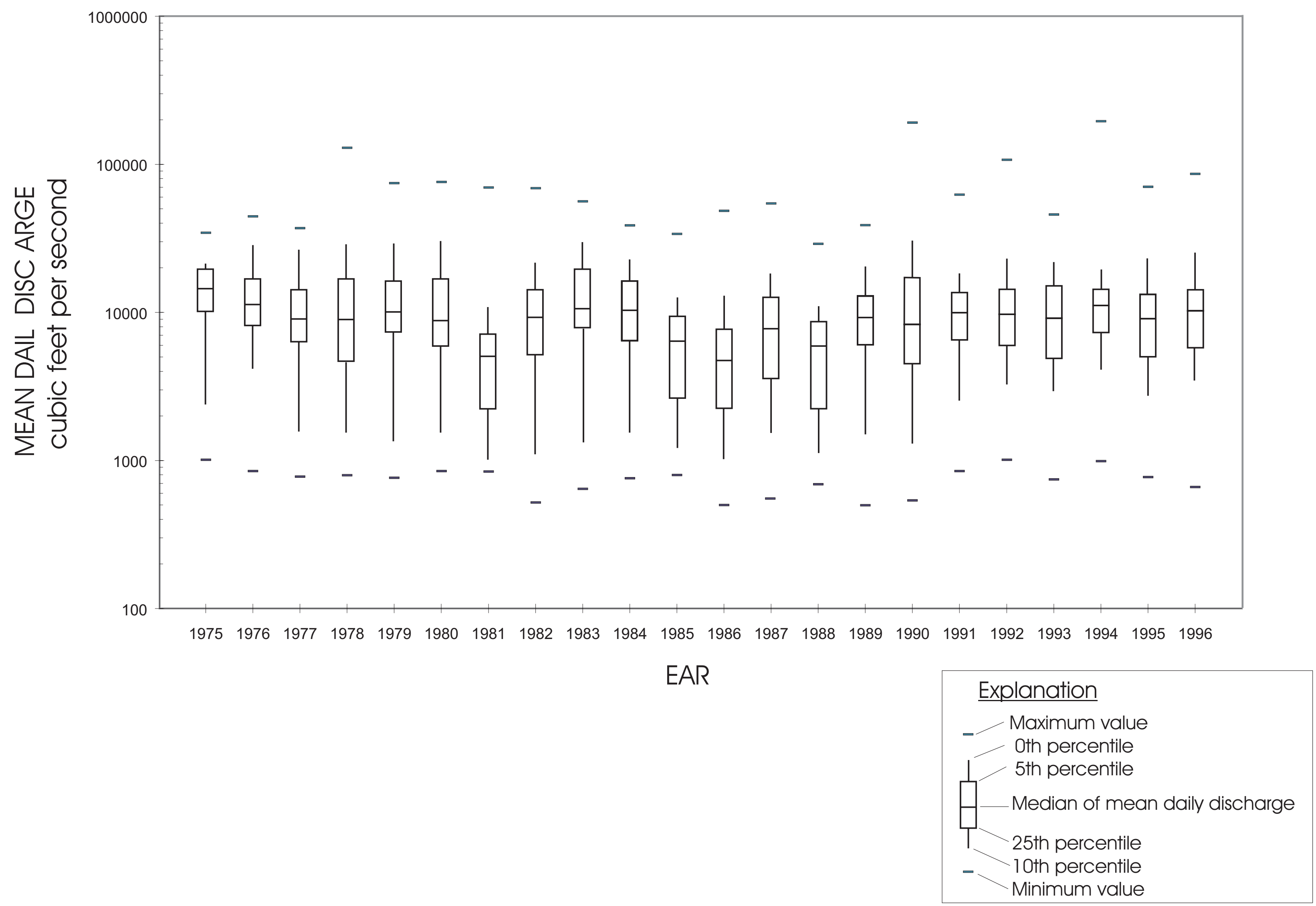


Figure 2-4. Mean Daily Discharge for the Chattahoochee River at Columbia, Alabama (USGS Station 02343801)

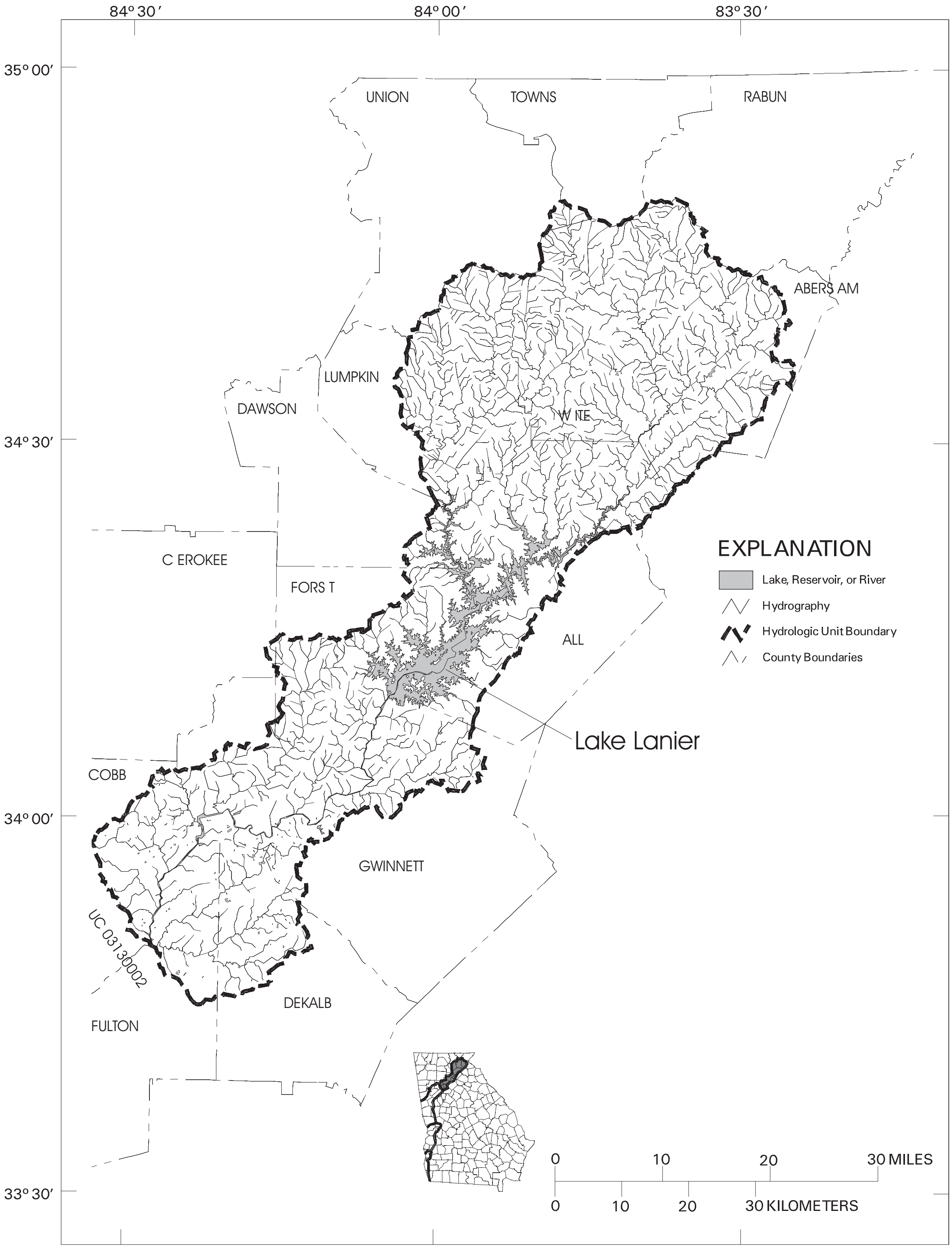


Figure 2-5. Hydrography, Upper Chattahoochee River Basin, HUC 03130001 (Headwaters to Peachtree Creek at Atlanta

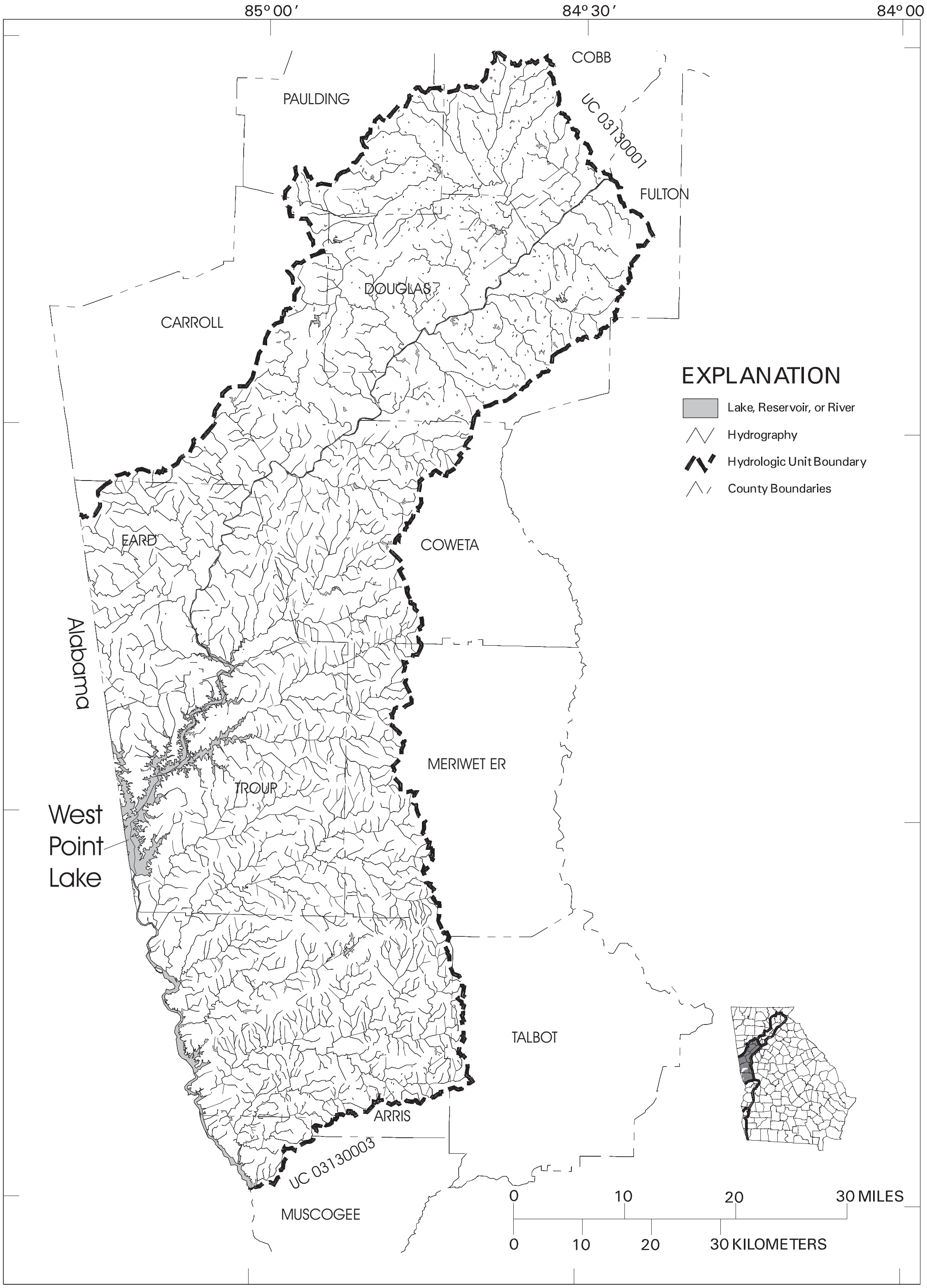


Figure 2-6. Hydrography, Middle Chattahoochee River Basin, HUC 03130002 (Peachtree Creek at Atlanta to Oliver Dam near Columbus)

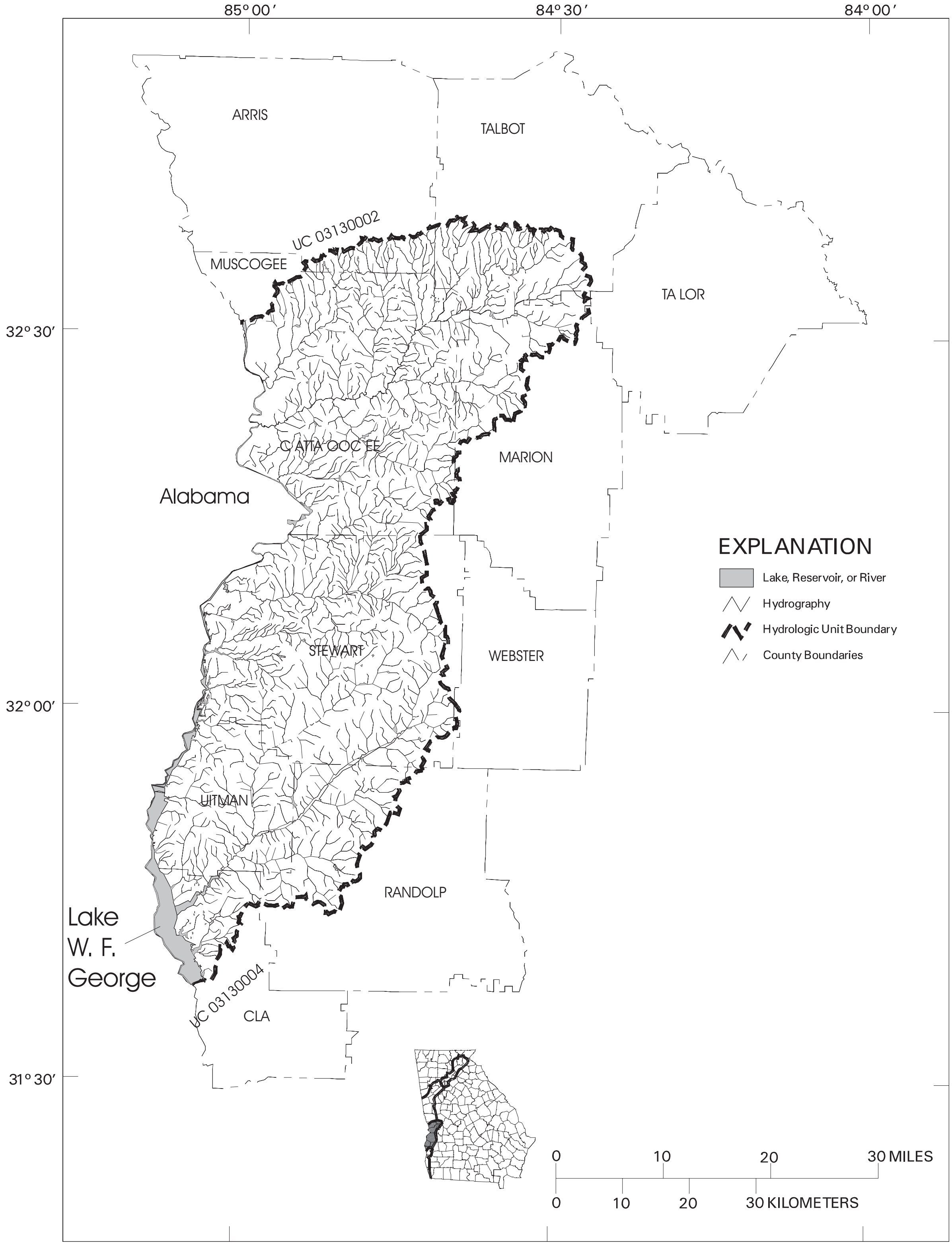


Figure 2-7. Hydrography, Middle Chattahoochee River Basin, HUC 03130003 (Oliver Dam near Columbus to Walter F. George Lock and Dam)

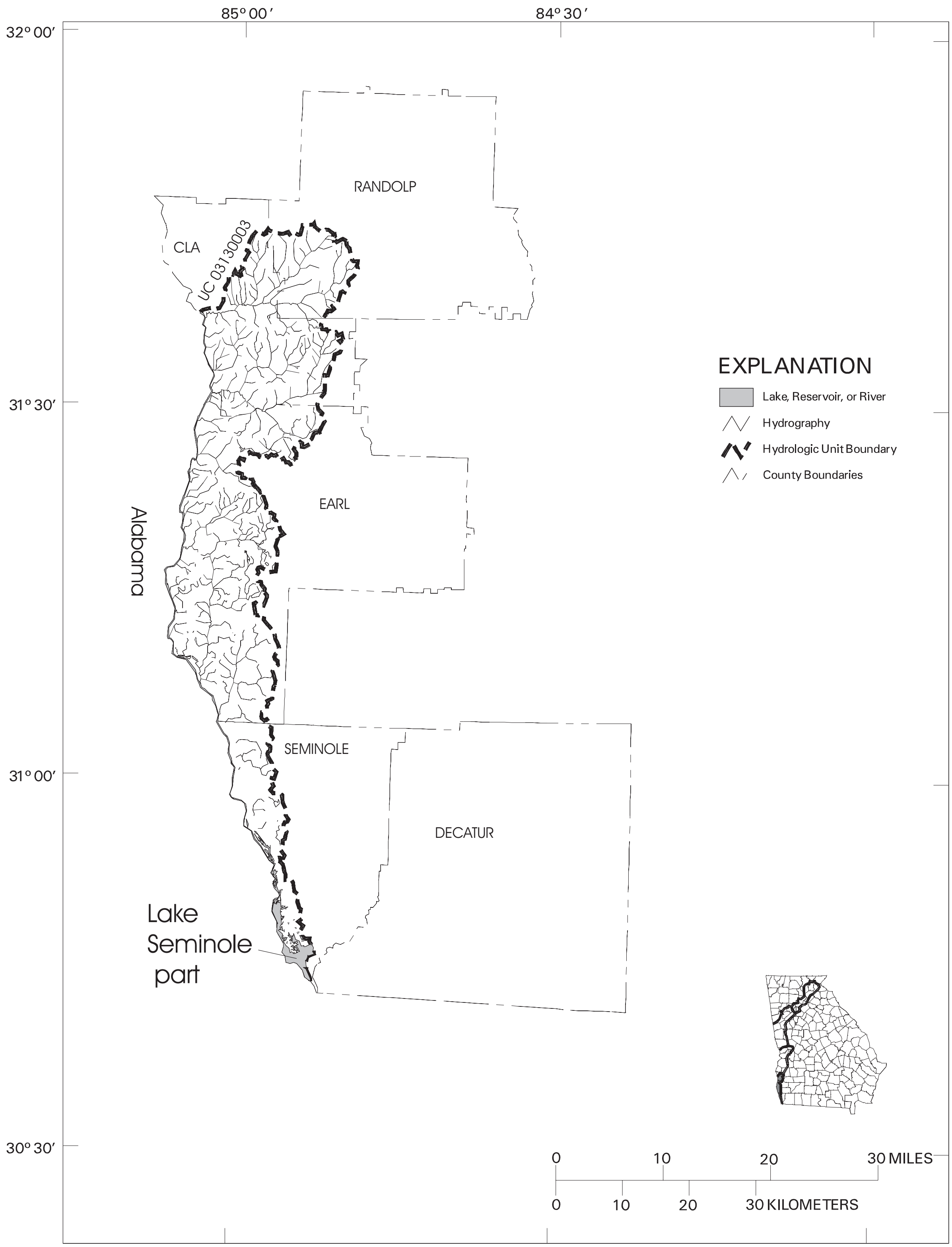
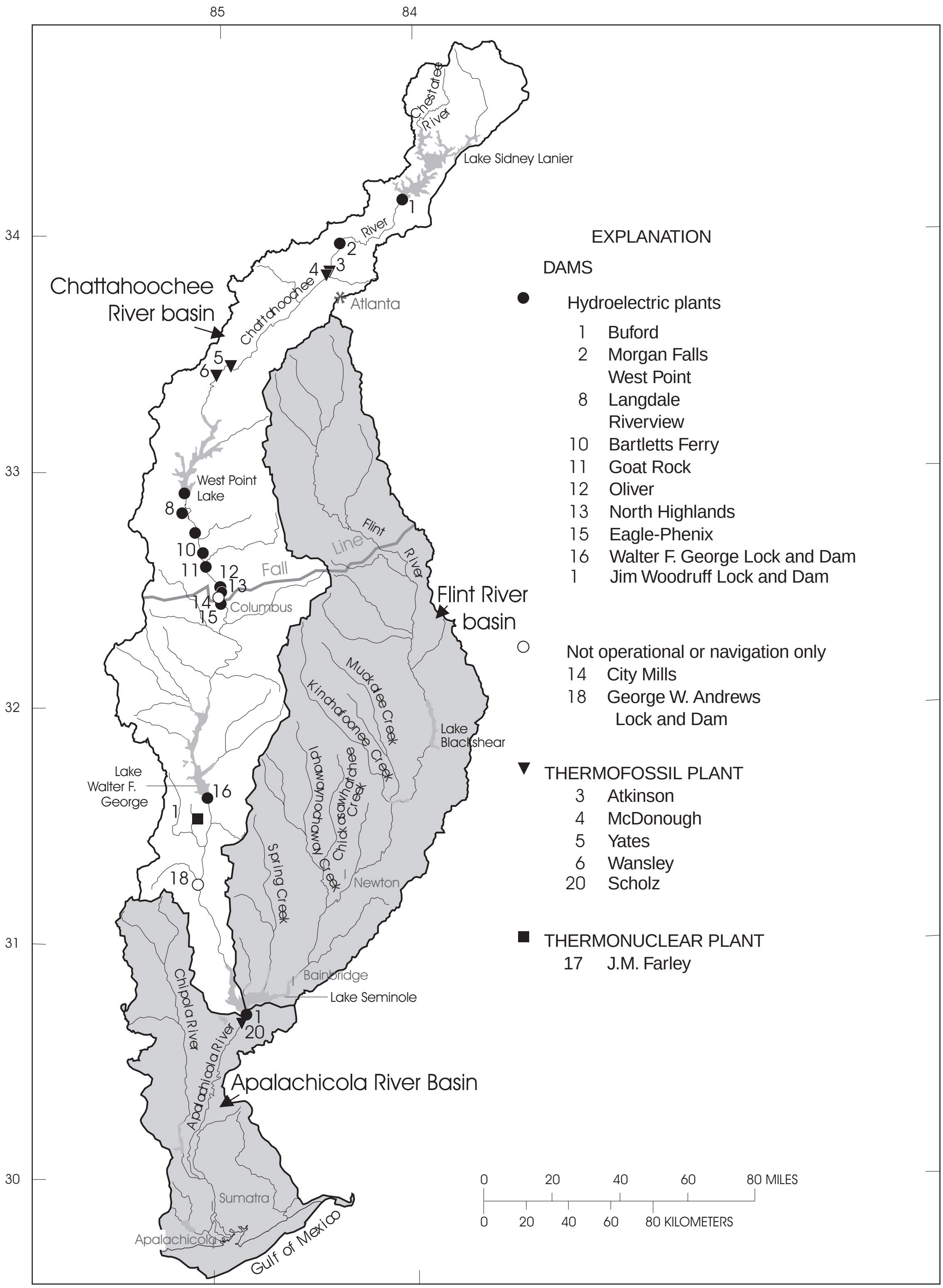


Figure 2-8. Hydrography, Lower Chattahoochee River Basin, HUC 03130004 (Walter F. George Lock and Dam to Lake Seminole)



Base modified from U.S. Geological Survey digital files

Figure 2-9. Location of Mainstem Dams and Power-Generating Plants in the Chattahoochee River Basin (modified from Couch et al., 1996)

of dams, although storage is used to augment flows during periods of low flow; and daily fluctuations below some reservoirs can be dramatic. Pronounced decreases in the frequency of high and low flows have occurred since the start of operation of Buford Dam that forms Lake Sidney Lanier. Lake Sidney Lanier, West Point Lake, and Lake Walter F. George provide most water storage available to regulate flows in the basin. Lake Sidney Lanier has the largest storage capacity, although it drains only 12% of the basin and also has the lowest ratio of inflow to storage, indicating that it is likely to be slower to recover from drought-induced drawdowns than other reservoirs in the basin.

Over most of its length, the flow of the Chattahoochee River is controlled by hydroelectric plants releasing water for production of hydropower. These hydroelectric plants use hydropeaking operations to augment power supply during peak periods of electric demand. At Cornelia, Georgia, the Chattahoochee River is free flowing; however, throughout the remainder of its length, the river shows the influence of hydropeaking operation.

In contrast to the main stem Chattahoochee River, many tributaries remain free flowing. Most tributaries have higher sustained flows during winter months, and show responses to storm events throughout the year. However, sharper peaks in the hydrograph of creeks in urban drainages reflect the greater influence of impervious land cover in this urban basin.

Reservoirs

The Chattahoochee basin contains fourteen major dams and associated impoundments (including Lake Seminole, which is an impoundment of the Apalachicola River below the confluence of the Chattahoochee and Flint Rivers), as shown in Table 2-2 and Figure 2-9.

Several of the dams are run-of-the-river hydropower operations, without significant storage capacity. The following nine impoundments have a surface area greater than 500 acres and are considered major lakes:

Lake Sidney Lanier is a multi-purpose water resource project constructed and operated by the U.S. Army Corps of Engineers (COE) and provides hydroelectric power, flood control, water supply, water quality, navigation, and recreation benefits. Lake Lanier is formed by Buford Dam, located 48 miles upstream from Atlanta (Peachtree Creek) at river mile (RM) 348.32, and has a full-pool surface area of 38,542 acres. The reservoir project was authorized by the U.S. Congress in 1946; construction began in 1950 and the reservoir was first filled in 1957 and reached full power pool in 1959. From Buford Dam the reservoir extends about 44 miles up the Chattahoochee River and about 19 miles up the Chestatee River. The reservoir has a basin drainage area of 1,040 square miles, a maximum pool elevation of 1,100 feet, and a conservation pool elevation of 1,071 feet. At the 1,071-foot elevation Lake Lanier has a surface area of 38,542 acres, a lake volume of 1,917,000 acre-feet, and a shoreline length of 540 miles. The Chattahoochee River (934 cfs) and the Chestatee River (568 cfs) contribute 45% and 28% of the annual average lake inflow. The annual average outflow is 2,071 cfs. The designated water use classification for the entire lake is Recreation. Lake Lanier is the largest impoundment located wholly in Georgia. It has the highest annual recreational visitation of all the COE lakes. Lake Lanier's shoreline is developed with residential housing and commercial marina facilities, and the human population of the watershed is growing rapidly.

Bull Sluice Lake is impounded by Morgan Falls Dam at RM 311.77, and is operated by Georgia Power for hydroelectric power and water quality purposes. It has a surface area of 580 acres.

Table 2-2. Major Dams and Impoundments in the Chattahoochee River Basin

Project Name	Owner/Yr Initially Completed	Drainage Area (Sq. mi.)	Reservoir Size (Ac)	Reservoir Storage Volume (Ac-Ft)	Total Power Capacity (kW)	Normal Lake Elevation (ft)
Buford Dam / Lake Lanier	COE / 1957	1,040	38,542	1,917,000	86,000	1,071
Morgan Falls Dam / Bull Sluice Lake	GPC / 1903	1,340	580	Run-of-river	16,800	866
West Point Dam and Lake	COE / 1975	3,440	25,900	604,527	82,200	635
Langdale Dam	GPC / 1860	3,600	152	Run-of-river	401	548
Riverview Dam	GPC / 1902	3,600	75	Run-of-river	480	531
Bartletts Ferry Dam / Lake Harding	GPC / 1926	4,260	5,850	181,000	129,300	521
Goat Rock Dam and Lake	GPC / 1912	4,500	1,050	11,000	68,100	404
Oliver Dam and Lake	GPC / 1959	4,630	2,150	32,000	60,000	337
North Highlands Dam	GPC / 1900	4,630	131	1,500	29,600	269
City Mills (inoperative)	City Mills / 1963	4,630	110	684	740	226
Eagle and Phenix Dam (inoperative)	Consolidated Hydro / 1834	4,640	NA	260	4,260	215
W.F. George Lock, Dam and Lake (Lake Eufaula)	COE / 1963	7,460	45,180	934,400	130,000	190
G.W. Andrews Lock, Dam, and Lake	COE / 1963	8,210	1,540	18,180	None	102
Jim Woodruff Lock and Dam / Lake Seminole	COE / 1954	17,230	37,500	367,320	30,000	77

Since its creation in 1904, Bull Sluice Lake has experienced extensive sediment deposition, which has created broad and shallow pools and wetlands attractive to recreation and fishing in the lake. The lake is characterized by low flow velocities, moderate algal productivity and dispersed aquatic vegetation, primarily *Elodea* (Law Environmental, 1994).

West Point Lake is a 25,900-acre reservoir operated by the COE on the Chattahoochee River on the Georgia-Alabama border. West Point Lake is impounded by West Point Dam and became operational in 1975. It is the first impoundment on the Chattahoochee River south of Atlanta, and ranks seventh in size for lakes in the state. West Point Dam is located just north of West Point, Georgia (106 miles downstream from Peachtree Creek in Atlanta) on the Georgia - Alabama border and the impoundment of the Chattahoochee River extends northward to Franklin, Georgia. The lake is just west of La Grange, Georgia. Portions of the lake lie within Chambers and Randolph Counties, Alabama, as well as within Troup and Heard Counties, Georgia. The reservoir was designed for flood control, navigation, power generation, recreation, fishing and wildlife habitat. The reservoir has a mean summer dam pool elevation of 635 feet above sea level, a drainage area of 3,440 mi^2, a surface area at full dam pool of 25,864 acres, a storage capacity of 604,527 acre/feet and a hydraulic retention time of 23 to 91 days. West Point Lake is the first Corps Reservoir to be constructed downstream from a major metropolitan area. The Chattahoochee River is the primary tributary to West Point Lake. Other tributaries to the lake include Wehadkee, Stroud and Veasey Creeks on the Alabama side and the New River, Brush, Whitewater, Potato, Yellowjacket, Beech and Jackson Creeks on the Georgia side. The lake is one of the best largemouth bass and hybrid lakes in the state, and also supports healthy white bass, crappie and channel catfish populations. Excellent facilities and close proximity to Atlanta contribute to the reservoir's popularity.

Lake Harding, also known as Lake Bartletts Ferry, is impounded by Bartlett's Ferry Dam at Chattahoochee River Mile 178.0 between LaGrange and Columbus, constructed in 1926. The reservoir is operated by Georgia Power as a run-of-the-river hydropower facility and water supply. Lake Harding is located approximately 7 miles northwest of Columbus, Georgia on the Alabama-Georgia border. Portions of the lake are located in Harris Co., Georgia, as well as in Chambers and Lee County, Alabama. The reservoir has a mean summer dam pool elevation of 521 feet above sea level. The surface area is 23.67 km^2 (5,850 acres), mean depth 9.4 meters, and maximum depth 33.8 meters. Mean hydraulic retention time is 14 days. There are 156 miles of shoreline. The basin drainage area is 10,958 km^2, with the Chattahoochee River being the primary tributary, comprising over 86% of the inflow. Other contributing tributaries include Blanton Creek, Mountain Oak Creek, Halawakee Cree, Osanippa Creek, and Flat Shoals Creek.

Goat Rock Lake, with a surface area of approximately 1,050 acres, is impounded by Goat Rock Dam, constructed in 1912, at River Mile 172.3, and is directly downstream from Bartlett's Ferry Dam and ten miles above Columbus on the Alabama-Georgia border. Georgia Power Company operates this lake principally for peaking hydropower generation. Portions of the lake are located in Harris County, Georgia and Lee County, Alabama. The reservoir was designed for hydroelectric power generation, with swimming, boating and fishing as secondary benefits. The lake was impounded in 1912. The reservoir has a mean summer dam pool elevation of 404 feet above sea level, and has 25.4 miles of shoreline. The Chattahoochee River is the primary tributary to Goat Rock Lake. Other tributaries to the lake include Mill Creek and Wacoochee Creek on the Alabama side and Mulberry Creek on the Georgia side.

Lake Oliver is the third in a chain of hydroelectric impoundments created on the Chattahoochee River by Georgia Power between West Point and Columbus, Georgia, and is operated by Georgia Power for peaking hydropower generation. Oliver Dam, at River Mile 163.2, became operational in 1962. Portions of the lake are located in Lee County, Alabama and Harris and Muscogee Counties in Georgia, including a portion within the Columbus city limits. The reservoir functions as the main water supply for the city of Columbus. The reservoir has a mean summer dam pool elevation of 337 feet above sea level, a surface area of 2,150 acres and has 40 miles of shoreline. The Chattahoochee River is the primary tributary to Lake Oliver. Other tributaries to the lake include Rock Creek and Turkey Creek on the Alabama side and Standing Boy Creek on the Georgia side.

Lake Walter F. George is formed by the COE dam near Fort Gaines, Georgia. The reservoir project was authorized by the U.S. Congress in 1946 to provide hydroelectric power, regulate transportation, provide flood control, and promote recreation. Construction began in 1955 and the reservoir was first filled in 1963. The reservoir lies along the Alabama-Georgia border and extends from Columbus to Fort Gaines. The Chattahoochee River channel crosses the Walter F. George Dam at 85°3'54" W, 31°37'26" N. The reservoir has a mean summer pool elevation of 190 feet, a surface area of 45,180 acres, mean depth of 20.3 feet, a lake volume of 934,400 acre-feet, a shoreline length of 640 miles, a basin drainage area of 7,460 square miles, a mean hydraulic retention time of 47 days, and a mean stream flow of 10,000 cfs. The Chattahoochee River is the primary tributary with over 80% of the total inflow. Other tributaries include Upatoi, Uchee, Hannahatchee, Cowikee, Chewalla, Barbour, Cheneyhatchee, and Pataula Creeks.

Lake Andrews, with surface area of 1,540 acres, occupies the 29 miles of the Chattahoochee River between Walter F. George Lock and Dam and George W. Andrews Lock and Dam near Blakely at River Mile 46.5. Andrews Lock and Dam, operational in 1963, is maintained by the COE primarily for navigation purposes. This reservoir acts more like a large river than a lake, and, as a result, the fish populations and fishery are riverine in nature.

Lake Seminole is located in the extreme southwestern corner of Georgia at the junction of the Chattahoochee and Flint Rivers, and is formed by the United States Army Corps of Engineers (COE) Jim Woodruff Lock and Dam. This dam is on the Apalachicola River at River Mile 107.6, just downstream of the confluence of the Chattahoochee and Flint Rivers. The reservoir project was authorized by the U.S. Congress in 1946 for primary purposes of hydropower and transportation. Other project purposes include regulation of stream flow, fish and wildlife conservation, and public recreation. Construction was completed in 1957. The reservoir lies in the southwest corner of Georgia along the Georgia-Florida border and is also shared in part with Alabama. From the dam the reservoir extends 47 river miles up both the Chattahoochee River and the Flint River. The reservoir has a basin drainage area of 17,150 square miles (51% Chattahoochee basin, 49% Flint basin). The Flint basin side contains two other significant embayments, Fish Pond Drain and Spring Creek. The normal summer pool elevation is 77 feet msl. At this elevation Lake Seminole has a surface area of 37,500 acres, a lake volume of 367,320 acre-feet, and a shoreline length of 250 miles. The annual average outflow is 21,800 cfs. The COE maintains a nine foot deep, 100 foot wide transportation channel extending commercial river transportation from the coast through Lake Seminole upstream to Columbus on the Chattahoochee River and to Bainbridge on the Flint River. Lake Seminole suffers from a severe infestation of the aquatic weed Hydrilla.

2.1.5 Ground Water Resources

The geology of the Chattahoochee River Basin determines the ground-water characteristics of the area. South of the Fall Line (which extends through Columbus) the Chattahoochee River flows through the Coastal Plain. Aquifers in the Coastal Plain consist of porous sands and carbonates, and include alternating units of sand, clay, sandstone, dolomite, and limestone that dip gently and thicken to the southeast. Several of these are prolific producers of ground water. The aquifers in the Coastal Plain are of two types: unconfined and confined. The unconfined aquifers are hydraulically interconnected to surface water bodies and the two form a single system; the confined or artesian aquifers, however, are buried and hydraulically isolated from surface water bodies. Confining units between these aquifers are mostly silt and clay.

From the Fall Line to Lake Seminole, progressively younger sediments crop out and overlie older sediments. The complex interbedded clastic rocks and sediments of Coastal Plain aquifers range in age from Quaternary to Cretaceous.

Five major aquifers underlie the Chattahoochee River Basin. These aquifers are listed below from south to north, in order of descending stratigraphy and increasing age. Generalized outcrop areas of major aquifers for the Chattahoochee River Basin are shown in Figure 2-10 in the context of the adjoining Flint and Apalachicola basins.

- The **Floridan aquifer** system, one of the most productive aquifers worldwide, underlies much of the southernmost portion of the Chattahoochee Basin. The Floridan aquifer system, which is unconfiend or semi-confined, is comprised of a thick sequence of carbonate rocks that are of Tertiary age and are hydraulically connected in varying degrees (Miller, 1986). The Ocala Limestone is one of the thickest and most productive formations that crops out in the Dougherty Plain and gives rise to a karst topography riddled with sinkholes. The complex hydrogeology of the Floridan aquifer system is reflected by highly variable transmissivities that range from 2,000 to 1,300,000 feet squared per day (ft^2/d). The range in transmissivities in the Ocala Limestone is caused by the variable, fractured nature, and the dissolution of limestone that creates conduits and solution openings (Miller, 1986).

- The **Claiborne aquifer** is an important source of water in part of southwestern Georgia. it is made up of sand and sandy limestone and is mostly confined in the areas where it is extensively used. It's principal water bearing formation is the Tallahatta Formation of Eocene age (McFadden and Perriello, 1983).

- The **Clayton aquifer**, contained in the Clayton Formation of Paleocene age is another important source of water in southwestern Georgia. It is made up of sand and limestone and is generally confined.

- The **Providence aquifer** system is the deepest of the principle aquifers in South Georgia. It serves as a major source of water in the northern one-third of the Coastal Plain. The aquifer system consists of sand and gravel that locally contains layers of clay and silt which function as confining beds. The principal water-bearing formation is the Providence Sand of Late Cretaceous age (McFadden and Perriello, 1983). Older Cretaceous strata generally are too deep to be economically developed. The Cretaceous aquifer system may be either confined or un-confined and cros out immediately below the Fall Line.

- North of the Fall Line, the Chattahoochee River Basin is underlain by bedrock, and ground water is contained within the **crystalline rock aquifer**. The crystalline rocks contain little primary porosity; rather, most ground water is stored in the porous saprolite and transmitted to wells in the bedrock via fractures. Currently, the crystalline rock aquifers are used primarily for private water supplies and livestock watering. It is commonly believed that ground water in this part of the state is not sufficient to support municipal supplies and industrial uses.

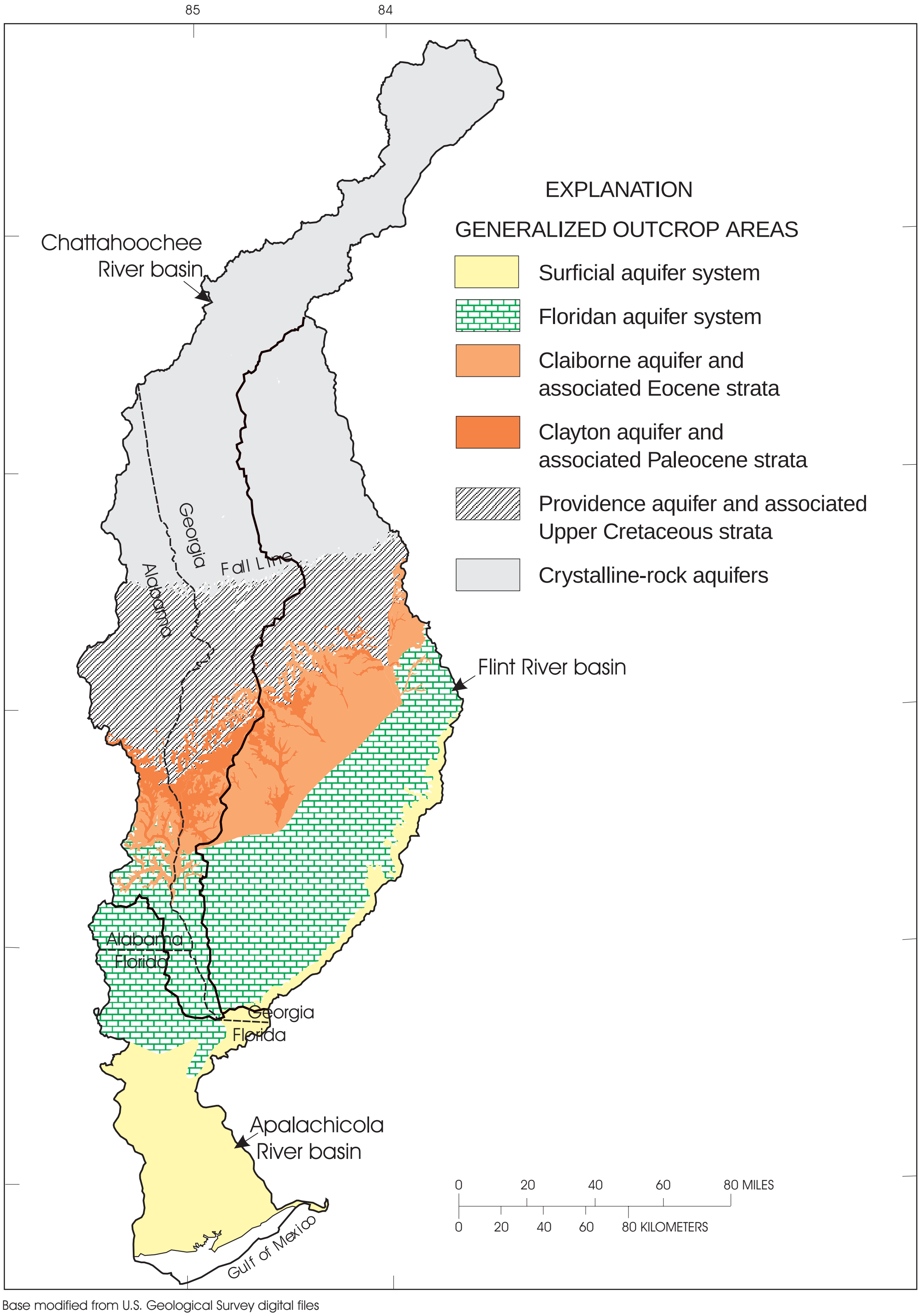


Figure 2-10. Hydrogeologic Units Underlying the Apalachicola-Chattahoochee-Flint River Basin (modified from Couch et al., 1996)

The regional direction of ground-water flow in the Coastal Plain is from north to south; however, local flow directions vary, especially in the vicinity of streams and areas having large ground-water withdrawals. Rivers and streams in the Coastal Plain Province commonly are deeply incised into underlying aquifers and receive substantial amounts of ground-water discharge. Strata associated with the Floridan aquifer system are exposed along sections of the Chattahoochee River (Maslia and Hayes, 1988). As a result of the greater hydraulic connection between the Floridan aquifer system and the Flint River, however, ground-water discharge contributes more significantly to baseflow in the Flint River than in the Chattahoochee River. Aquifer discharge to the Chattahoochee River is estimated to be one-fifth of the amount that discharges to the Flint River (Torak et al., 1991). In areas such as the northern part of the Fall Line Hills District where unconfined aquifers are used for water supply, ground and surface water are closely interconnected and pumpage of ground water reduces stream flow at a ratio approaching 1:1. Further south, however, the sediments progressively deepen, and, eventually, the aquifers become confined and the ground and surface water regimes are only poorly interconnected. Where this happens, pumpage from wells no longer affects stream flow. The unconfined aquifers in the Coastal Plain have average pollution susceptibility. The confined aquifers, because they are buried and isolated, are less susceptible to pollution from activities at the land surface.

North of the Fall Line, the Piedment aquifer system is characterized by relatively low-yielding wells. Ground water is stored in a mantle of soil and saprolite (decomposed rock) and transmitted to wells via fractures or other geologic discontinuities in the crystalline bedrock. These crystalline rocks have similar hydraulic characteristics and are mapped as one aquifer. Each surface water drainage basin or watershed is also a ground water drainage basin or watershed; surface and ground water are in such close hydraulic interconnection they can be considered as a single and inseparable system. In general, pumpage of ground water reduces stream flow at a 1:1 ratio. Reported yields of wells completed in the crystalline-rock aquifer range from zero to 471 gallons per minute (gal/m), but are commonly less than 50 gal/m with a typical yield of 20 gal/m (Cressler et al., 1983; Chapman et al., 1993). In the Piedmont, the decomposed rock or saprolite contains considerable clay that acts as a barrier to ground water pollution. As a result, ground water in this section of the Chattahoochee basin has below average pollution susceptibility.

2.1.6 Biological Resources

Human activities have altered and transformed much of the Chattahoochee River Basin; yet, the basin's environment is noteworthy for its remaining biological diversity. The Chattahoochee River Basin contains parts of the Blue Ridge Mountains and Southeastern Plains Ecoregions (Omernik, 1987). The Blue Ridge Ecoregion is contained within the small part of the basin in the Blue Ridge Land Resource Area. The Southeastern Plains Ecoregion encompasses all the remainder of the Chattahoochee River Basin. These ecoregions are intended to identify areas of relatively homogeneous ecological systems and are partially based on the distribution of terrestrial biota.

Terrestrial Habitats

The health of aquatic ecosystems is linked to the health of terrestrial ecosystems. All parts of the Chattahoochee River Basin have been subjected to varying degrees of forest-cover alteration. Small-scale disturbance of native forests began with American Indians who used fire to create fields for cultivation. Forest disturbance was greatly accelerated by European settlers who logged throughout the basin and extensively cleared land for agriculture in the Piedmont and Coastal Plain. Between 1868 and approximately 1940, hydraulic mining of gold in the Blue Ridge also resulted in locally extensive deforestation of land (Leigh, 1994).

Prior to European settlement, the Chattahoochee River Basin was mostly forested. Historically, the Blue Ridge Province was covered by oak-chestnut-hickory forests, with hemlock in moist coves and white pine in drier ridges. Chestnut was extirpated from these forests as a result of the Chestnut Blight. Native forests in the Piedmont Province were dominantly deciduous hardwoods and mixed stands of pine and hardwoods. The Coastal Plain supported oak-sweetgum-pine forests, with gum-cypress in floodplain forests. Parts of the lower Coastal Plain were vegetated by open savannahs of wiregrass and longleaf pine (Wharton, 1978).

Although land cover in the Blue Ridge Province historically has been dominated by forest, forest-species composition and age structure have been altered by mining, logging, and disease. Deforestation caused by mining and logging resulted in localized severe erosion and thick sediment deposits in floodplains in the Blue Ridge. As much as five feet of sediment has been deposited in floodplains of the Chestatee River in the upper Chattahoochee River Basin as a result of hydraulic mining of gold (Leigh, 1994).

The Piedmont Province experienced two major phases of land abandonment – after the Civil War, during the agricultural depression of the late 1880's, and after the boll weevil infestation in the 1920's. Cotton production in the Piedmont Province left the land relatively infertile and almost devoid of topsoil. Almost all topsoil in the Piedmont had been eroded by 1935 (Wharton, 1978). Abandoned agricultural lands were replaced by the secondary forests that cover most of the Piedmont today.

Forest cover probably reached a low between 1910 and 1919 basinwide when agriculture was at peak acreage. By the 1920's, about 87 percent of the Piedmont had been cultivated (Plummer, 1975). By the mid-1970's, approximately 59 percent of the land cover in the entire Apalachicola-Chattahoochee-Flint River basin was forests of second growth stands and large acreages of planted pine (U.S. Geological Survey, 1972-78).

Wetland Habitats and Aquatic Vegetation

Wetlands are lands transitional between terrestrial and deep-water habitats where the water table is at or near land surface or the land is covered by shallow water (Cowardin et al., 1979). Most wetlands in the Chattahoochee River Basin are forested wetlands located in floodplains of streams and rivers. Forested-floodplain wetlands are maintained by the natural flooding regime of rivers and streams, and in turn, influence the water and habitat quality of riverine ecosystems.

Assessments of wetland resources in Georgia have been carried out with varying degrees of success by the Natural Resources Conservation Service (Soil Conservation Service-USDA), the US Fish and Wildlife Service National Wetland Inventory, and Georgia's Department of Natural Resources.

Wetlands Inventory

Hydric soils as mapped in county soil surveys are useful indicators of the location and extent of wetlands for the majority of Georgia counties. The dates of photography from which the survey maps are derived vary widely across the state. However, soil surveys have proven useful in wetland delineation in the field and in the development of wetland inventories.

County acreage summaries provide useful information on the distribution of wetlands across the state.

The National Wetland Inventory (NWI) of the U.S. Fish and Wildlife Service utilizes soil survey information during photo-interpretation in the development of the 7.5 minute, 1:24,000 scale products of this nationwide wetland inventory effort. Wetlands are classified according to the Cowardin system, providing some level of detail as to the characterization of individual wetlands. Draft products are available for the 1,017 7.5 minute quadrangles in the state of Georgia, and many final map products have been produced. More than 100 of these quadrangles are available in a digital format. Although not intended for use in jurisdictional determinations of wetlands, these products are invaluable for site surveys, trends analysis, and land-use planning.

A complementary database was completed by Georgia DNR in 1991 and is based on classification of Landsat Thematic Mapper (TM) satellite imagery taken during 1988-1990. Due to the limitations of remote sensing technology, the classification scheme is simplified in comparison to the Cowardin system used with NWI. Total wetland acreage based on landsat TM imagery is 76,691 acres or 2 % of land area in the Chattahoochee River Basin. These data underestimate the acreage of forested wetlands in the Piedmont and Coastal Plain, where considerable acreage may have been classified as hardwood or mixed forest.

Aquatic Fauna

This section focuses on aquatic or wetland species including fishes, amphibians, aquatic reptiles, and aquatic invertebrates. However, the Chattahoochee River Basin is rich in many other fauna that rely on the water resources of the basin, including many species of breeding birds and mammals. Although a description of these bird and mammal species is beyond the scope of this report, the water needs of these species, such as bald eagles, fish-eating mammals, and migratory water fowl, should be considered in water-resource planning and management.

Fish Fauna. The diverse fish fauna of the Chattahoochee River Basin includes 104 species representing 22 families (Couch et al., 1996). Ten fish species occurring within the Chattahoochee River Basin have been listed for protection by Federal or State agencies as endangered, threatened, rare, unusual, or extirpated. Two species are listed by the State as threatened: the bluestripe shiner (*Cyprinella callitaenia*) and highscale shiner (*Notropsis hypsilepsis*), while the Gulf Coast sturgeon (*Acipenser oxyrhynchus desoti*) is listed as extirpated in Georgia. The Gulf Coast sturgeion is listed as threatened under the Federal Endangered Species Act (ESA), while the bluestripe shiner is a candidate for listing as threatened or endangered under the ESA.

The largest number of fish species in the Chattahoochee River Basin (31) are in the minnow family Cyprinidae. Minnows are small fish that can be seen darting around in streams. Other families with large numbers of species are the sunfishes (Centrarchidae), the catfishes (Ictalaridae), and the suckers (Catostomidae). Species that have the largest numbers of individuals living in streams typically are minnows and suckers. These species are often not well known because, unlike sunfish, black bass, and catfish, people do not fish for them, although certain minnows may be used as bait. Minnows have an important role in the aquatic food chain as prey for larger fish, aquatic snakes, turtles, and wading birds such as herons. Suckers can grow to more than one foot long and are named for their down-turned mouth that they use to "vacuum" food from stream bottoms. Although suckers are not popular game fish, they are ecologically important because they often account for the largest fish biomass in streams.

Sixteen fish species have been introduced in the Chattahoochee River Basin by humans. Introduced species include the rainbow and the brown trout, white catfish, flathead catfish, black bullhead, goldfish, carp, rough shiner, red shiner, white bass, spotted bass, rock bass, crappie, yellow perch, sauger, and walleye.

The headwaters of the Chattahoochee River Basin support self-sustaining populations of brook trout, the only trout considered native to the eastern United States. Naturalized populations of rainbow and brown trout, which were introduced into Georgia in the 1890s, are also well established in the basin. Georgia's trout streams support very low standing crops of fish due to the extremely soft water associated with the igneous and metamorphic geologic strata making up the southern Blue Ridge Mountains. This fact, coupled with a high demand for recreational fishing, led the Georgia DNR to begin stocking catchable (9-inch+) hatchery-reared trout many years ago. At present, many streams in the headwaters of the Chattahoochee, Chestatee and Soque rivers are stocked with trout from March through August each year. These put-and-take stockings, along with natural reproduction by wild trout populations, support a fishery that has considerable recreational as well as economic value. The best quality trout streams are located in the higher elevations, primarily on national forest land. A few trout streams in the basin are managed with special regulations to produce large trout or high catch rates, including Waters and Dukes creeks (managed by the state for public fishing) and several fee-fishing stream segments on the Soque River that are managed by private landowners for trophy fish.

Downstream of trout waters, the larger streams support limited populations of coolwater/warmwater fishes such as redeye, spotted and largemouth bass, sunfish, suckers, bullheads and a variety of non-game species. A popular relative of the redeye, the yet to be described shoal bass, is found in the Chattahoochee and Chestatee rivers above Lake Lanier. Small tributary streams in this area support limited game fish populations, but diverse populations of non-game species, unless water quality or habitat is severely impacted by pollution. Because such streams have not been sampled much, little detail is known about actual species composition and standing crops. Much work needs to be done to better understand the impacts of land use changes on aquatic habitat in these streams.

Lake Lanier, the uppermost major impoundment on the Chattahoochee River, supports popular fisheries for a number of game fish species, most notably black bass (spotted and largemouth), striped bass, crappie and white bass. Lake Lanier's black bass fishery attracts several major bass tournaments each year and dozens of smaller ones.

For approximately 45 miles downstream of Lake Lanier, the Chattahoochee River is again classified trout water because of the cold hypolimnetic discharge from Buford Dam. River flow in the tailwater fluctuates daily due to power generation between a minimum of approximately 550 cubic feet per second and up to 8,400 cfs during peak generation. Approximately 350,000 catchable and fingerling trout are stocked annually by the GA DNR, supporting a major trout fishery that provides a unique recreational opportunity for the metropolitan Atlanta area. Most of this river section is considered part of the Chattahoochee River National Recreation Area, and scattered tracts of land adjoining the river are owned by the National Park Service. These areas serve as public access points for recreational use (primarily fishing) of the river.

The Chattahoochee River from Peachtree Creek downstream to West Point Lake has been impacted by urban runoff and municipal/industrial discharges from the City of Atlanta. Limited sampling data from this section of the river has indicated a dominance of rough fish such as carp and relatively low numbers of sport fish species. In recent years, adult striped bass migrating upstream from West Point Lake have attracted some attention from sport fishermen, and the spring white bass spawning run from West Point is also a significant fishery. Tributary streams to this part of the river are relatively small, but support limited fisheries for sunfish, catfish and redeye bass. Couch *et al*. (1995) list the fish species identified in historic surveys of streams of the metropolitan Atlanta area using museum records. Because many of these surveys were conducted before basins became urbanized, the records indicate fish species that were present when these basins were mostly rural. Forty-two native fish species have been found in tributaries of the Chattahoochee River in the study area.

West Point Lake supports high-quality fisheries for largemouth bass and hybrid bass, and fishing for crappie and channel catfish is also good. The lake has also been stocked with striped bass. The high nutrient content of water flowing into the lake from the Chattahoochee River is partially responsible for the quality of the fishery. The West Point fishery is an important part of the local economy, as the lake is a popular location for major bass tournaments and several fishing guides depend on it for a livelihood.

After flowing freely for a few miles downstream from West Point Lake, the Chattahoochee River is impounded by a series of small hydro-power projects owned and operated by Georgia Power Company and other entities. The largest of these, Lake Harding (also known as Bartletts Ferry Lake), has an excellent largemouth bass fishery, and fishing is also good for white bass and hybrid bass. Lake Harding is stocked with the Gulf strain of striped bass, as part of a tri-state cooperative effort to maintain the remnant striped bass strain indigenous to these waters. Lake Oliver, at 2,150 acres, is better known for its bream and crappie fisheries, but fishing for white and hybrid bass is also good. Goat Rock Lake, at 940 acres, is a lesser known lake with little development around it. It supports fisheries for bass, sunfish, hybrid bass, and catfish. In addition to the three lakes mentioned above, dams at five other locations between West Point and Columbus utilize at least part of the river flow for power generation, but provide only minor fishery resources.

Below Columbus, the Chattahoochee River flows into Lake Walter F. George. This lake supports popular fisheries for largemouth, white, and hybrid bass, as well as crappie and catfish. It is also stocked with the Gulf strain striped bass. Lake Seminole, at the terminus of the Chattahoochee River, has long had an excellent reputation for largemouth bass fishing, and it attracts numerous tournaments and supports several guide services. It also has good fisheries for white and hybrid bass and catfish. Gulf strain striped bass are stocked in the reservoir to help maintain a viable population in the Apalachicola-Chattahoochee-Flint system.

Amphibians and Reptiles. In addition to the diversity of fish fauna, the Chattahoochee River Basin is noteworthy for its diversity of amphibians and reptiles. Martof (1956) provides a checklist with distributional notes for species in the basin. This checklist indicates that the Chattahoochee River Basin is inhabited by about 24 species of freshwater aquatic turtles, about 37 species of salamanders and sirens, about 30 species of frogs and toads, and the American alligator. All require freshwater to complete or sustain their life cycles. In addition, numerous species of snakes and lizards inhabit the basin.

Two species of turtles are noteworthy because of their rarity and protected status. The alligator snapping turtle (*Macroclemys temmincki*), the world's largest freshwater turtle, is designated as threatened as a result of commercial overharvesting for its meat. Barbour's map turtle (*Graptemys barbouri*), a Federal candidate species under the Endangered Species Act, is endemic to the Coastal Plain part of the ACF basin. The natural range of the turtle was decreased by the formation of Lake Seminole causing a decline in population, and its population then further declined because of harvesting for meat. Both species occur in Lake Seminole and have been reported at least once in the lower Chattahoochee.

Aquatic Macroinvertebrate Fauna. With the exception of perhaps mollusc (Heard, 1977) and crayfish species (Hobbs, 1942, 1981), knowledge of the number and distribution of aquatic-invertebrate species that inhabit the Chattahoochee River Basin is limited. Perhaps the largest diversity of macrofaunal-aquatic organisms occurs among the insects. However, information on the occurrence of aquatic insect species is limited to checklists relevant only to selected taxa and only in portions of the Chattahoochee River Basin.

Hobbs (1942, 1981) lists 20 species of crayfish that occur in the Chattahoochee or Flint River basins. Six species are endemic to the Chattahoochee River Basin.

Aquatic and Wetland Vegetation. While the Chattahoochee River Basin supports a diverse population of upland plants, wetland areas are limited, while lakes and ponds occur only as a result of man's activities. The Georgia Natural Heritage Program has identified 77 Special Concern plant species occurring in the Chattahoochee River Basin, including species designated as unusual, rare, threatened, or endangered. Among these, there are nine wetland or aquatic species with state threatened or endangered status (Table 2-3).

Table 2-3. Threatened or Endangered Wetland and Aquatic Plant Species in the Chattahoochee River Basin

Common Name	Species	Status	Habitat
Shoals Spiderlily	*Hymenocallis coronaria*	E	River shoals
Curtiss Loosestrife	*Lythrum curtissii*	T	Openings in calcareous swamps
Lax Water-milfoil	*Myriophyllum laxum*	T	Bluehole spring runs; shallow, sandy, swift-flowing creeks; clear, cool ponds
Clearwater Butterwort	*Pinguicula primuliflora*	T	Sandy, clearwater streams and seeps; Atlantic white cedar swamps
Monkeyface Orchid	*Platanthera integrilabia*	T	Red maple-gum swamps; seeps and bogs
Whitetop Pitcherplant	*Sarracenia leucophylla*	E	Wet savannas, pitcherplant bogs
Parrot Pitcherplant	*Sarracenia psittacina*	T	Wet savannas, pitcherplant bogs
Purple Pitcherplant	*Sarracenia purpurea*	E	Swamps, wet rhododendron thickets
Sweet Pitcherplant	*Sarracenia rubra*	E	Atlantic white cedar swamps; wet meadows

Aquatic vegetation and algae may thrive in areas where changes in water quality, such as nutrient enrichment or altered hydraulic conditions occur, and may result in nuisance conditions. These problems are most likely to occur in reservoirs in the Coastal Plain Province, where stable water levels, shallow depths, sedimentation, high nutrient inputs, and a mild climate provide conditions favorable to the proliferation of aquatic vegetation, particularly introduced species.

Lake Seminole has experienced severe problems with noxious growths of aquatic plants, and as much as 80 percent of the lake's surface area has been covered by aquatic plants. Noxious growth of aquatic plants in Lake Seminole began in 1955 at the time water began to be impounded (Gholson, 1984). In 1973, an aquatic plant survey of Lake Seminole identified more than 400 species, of which 70 were classified as noxious or potentially noxious plants. Several introduced species have established themselves, including Eurasian milfoil (*Myriophyllum spicatum*), giant cutgrass (*Zizaniopxis miliacea*), water hyacinth (*Eichorina crassipes*) and Hydrilla (*Hydrilla verticillata*).

2.2 Population and Land Use

2.2.1 Population

The Chattahoochee River Basin is located in the heart of the Nation's "sunbelt" region. Metropolitan Atlanta, the largest metropolitan area in the southeastern United States, is partly within the Chattahoochee River Basin. Population distribution in the basin at the time of the 1990 Census by Census blocks is shown in Figure 2-11. A summary of 1990 population estimates by HUC units based on census tract/block centroids (EPA Geographic Information Query System) for Georgia, Alabama and Florida by HUC is shown in Table 2-4.

As of 1995, nearly 91 percent of the basin population lived in Georgia with nearly 76 percent of that population in the Atlanta metropolitan area (DRI/McGraw-Hill, 1996). Population centers in the Chattahoochee watershed outside the Metropolitan Atlanta area include the Columbus, Georgia, and Phenix City, Alabama, area (210,000 population). Most other population centers have fewer than 50,000 people, and generally are in the range of 5,000 to 10,000 people.

Between 1985 and 1995, the population in the Chattahoochee River Basin increased by 1.9 percent per year. With vigorous job creation expected, the proportion of Georgia’s population resident within the Chattahoochee Basin is expected to continue to increase (DRI/McGraw-Hill, 1996). Basin population is projected to increase at a rate of 1.2 percent per year between 1995 and 2000, and continue at 1.1 percent per year through 2010. The largest increases in population are projected for the Metropolitan Atlanta area. The predominantly rural counties of the southern part of the basin are projected to have stable or slightly declining populations (DRI/McGraw-Hill, 1996).

2.2.2 Employment

The Chattahoochee River Basin has by far the largest employment share within the overall Apalachicola-Chattahoochee-Flint (ACF) River basin, accounting for nearly 80 percent of all jobs in the basin 1990. Since 1975, the Chattahoochee basin has experienced strong employment growth, with jobs expanding at a 4.2% annual rate from 1975-90. (DRI/McGraw-Hill, 1996). Since metropolitan Atlanta and Columbus are included within the basin, strong employment growth is projected to continue, although at a somewhat decelaeated rate of 1.6% per year through 2010.

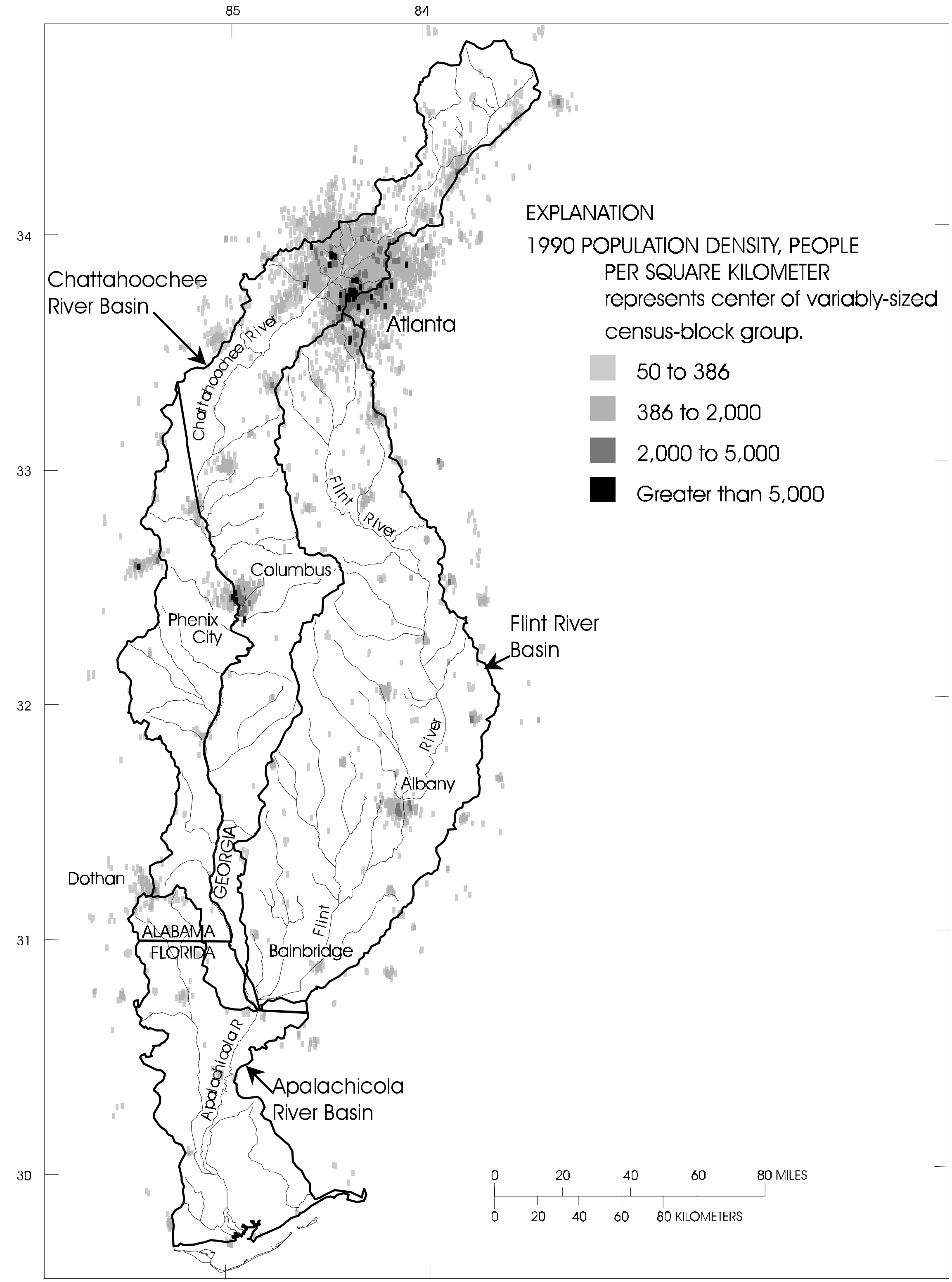


Figure 2-11. Population Density in the Apalachicola-Chattahoochee-Flint River Basin, 1990 (modified from Couch et al., 1996)

Table 2-4. Population Estimates for the Chattahoochee River Basin by HUC (1990)

HUC	Population	Housing Units
03130001	907749	429492
03130002	687175	279950
03130003	276842	109050
03130004	48937	19566
Total	*1920703*	*838058*

While employment will continue to increase, type of employment within the basin is also undergoing a dramatic shift. Manufacturing employment, which accounted for over 17% of the basin's jobs in 1975, had declined to 13% by 1990 and is projected to represent only 3.1% of the basin's jobs by 2050. This reflects transition to a more dominantly service-based economy, and service-related jobs are predicted to increase to over 44% of the basin's jobs by 2050. Despite this transition, industrial production within the basin is expected to continue to grow. The group with the fastest-growing production will be "other nondurables" (nondurables excluding food processing, textiles, paper, and chemicals). Textiles, once an important part of the industrial base, are expected to see the least growth, reflecting strong international competition.

2.2.3 Land Cover and Use

Land use/land cover classification was determined for the Chattahoochee River Basin based on high-altitude aerial photography for 1972-76 (U.S. Geological Survey, 1972-78). Subsequently in 1991 land cover data were developed based on interpretation of Landsat TM satellite image data obtained during 1988-90, leaf-off conditions. These two coverages differ significantly. Aerial photography allows identification of both land cover and land uses. Satellite imagery, however, detects primarily land cover, and not land use, such that a forest and a wooded subdivision may, for instance, appear similar. Satellite interpretation also tends to be less accurate than aerial photography.

The 1972-76 classification, after being updated for expanded urban areas based on the 1990 Census (Couch et al., 1996), indicates that 68 percent of the basin land area was forest, 19 percent was agriculture, and 9 percent was urban land cover, with 4 percent in other land uses, including less than 1 percent wetlands (Figures 2-12 through 2-15). In contrast to the Piedmont Province, agriculture comprised a larger percentage of land cover in the Coastal Plain. Urban land cover was concentrated in the upper part of the Chattahoochee River Basin in the Metropolitan Atlanta area. The 1988-90 land cover interpretation showed 73% of the basin in forest cover, 2 % in wetlands, 5 % in urban land cover, and 16% in agriculture (Figures 2-16 through 2-19). Statistics for 15 landcover classes in the Georgia portion of the Chattahoochee basin for the 1988-90 coverage are presented in Table 2-5 (GA DNR, 1996).

Forestry

Commercial forest lands represent about 66 percent of the total land area in the Chattahoochee River Basin according to the US Forest Service's Forest Statistics for Georgia, 1989 report (Thompson, 1989). Private landowners account for 77 percent of the ownership while the forest industry companies account for 15 percent. Governmental entities account for about 8 percent

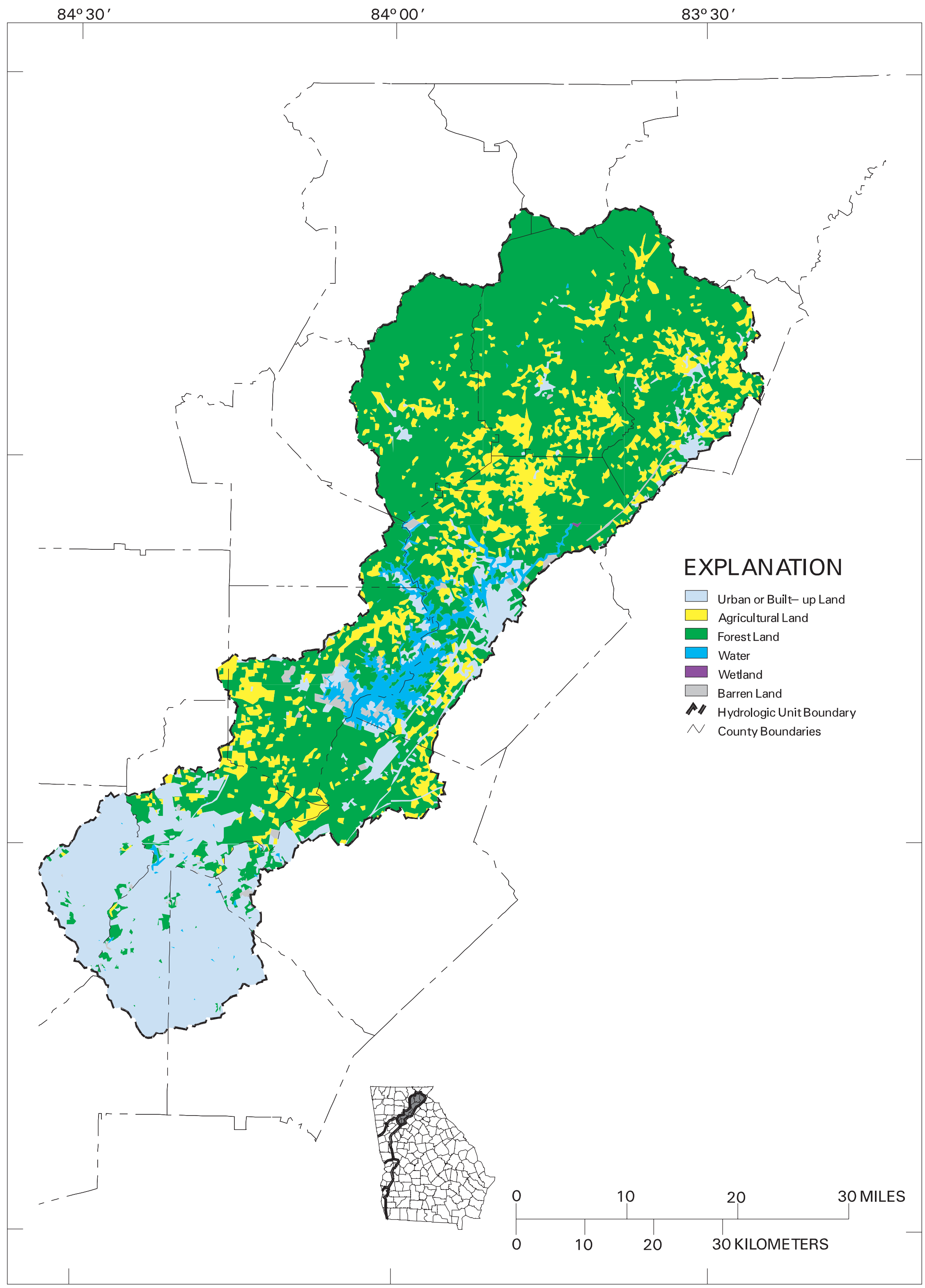


Figure 2-12. Land Use, Upper Chattahoochee River Basin, HUC 031300001, USGS 1972-76 Classification Updated with 1990 Urban Areas

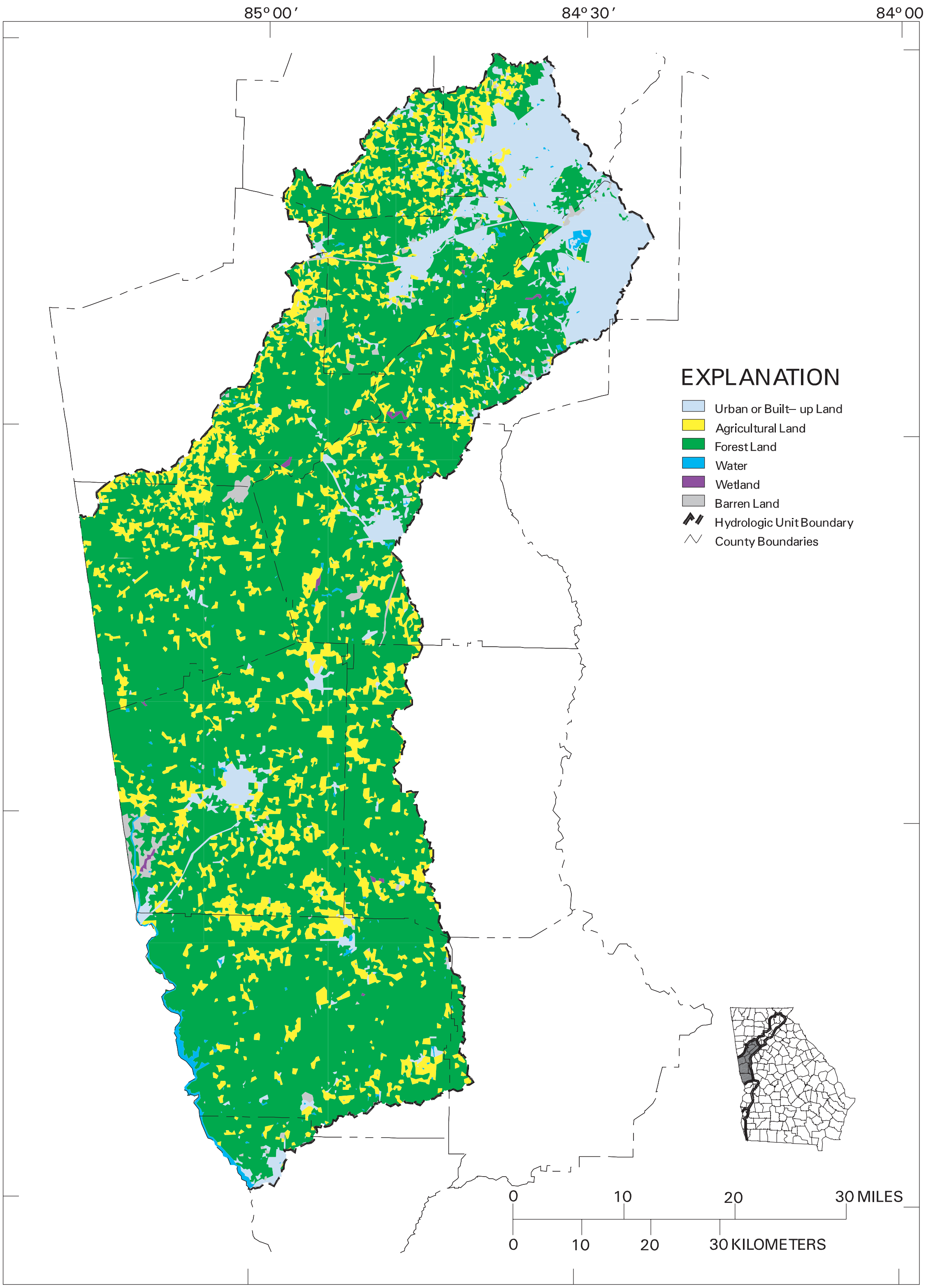


Figure 2-13. Land Use, Middle Chattahoochee River Basin, HUC 03130002, USGS 1972-76 Classification Updated with 1990 Urban Areas

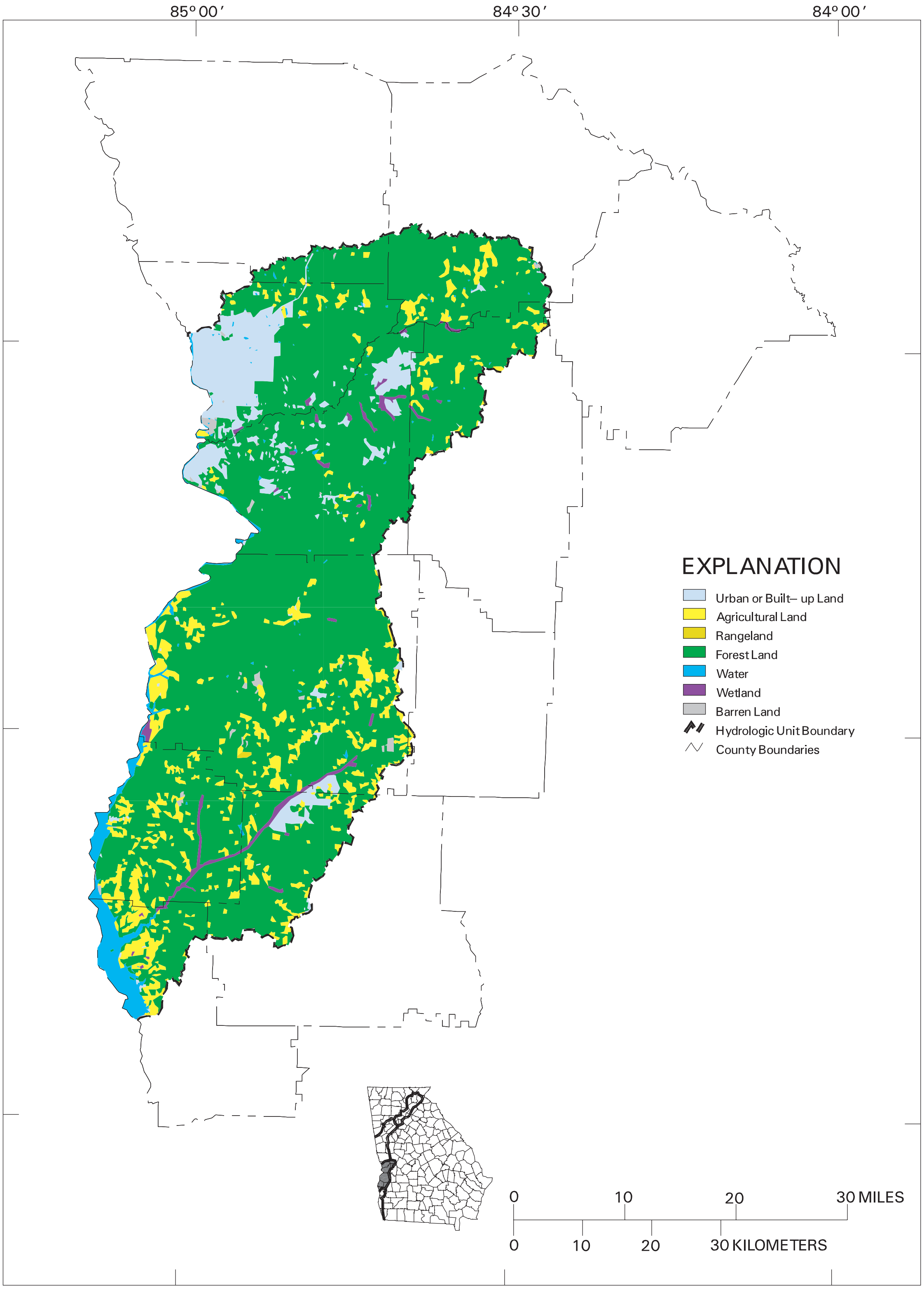


Figure 2-14. Land Use, Middle Chattahoochee River Basin, UUC 03130003, USGS 1972-76 Classification Updated with 1990 Urban Areas

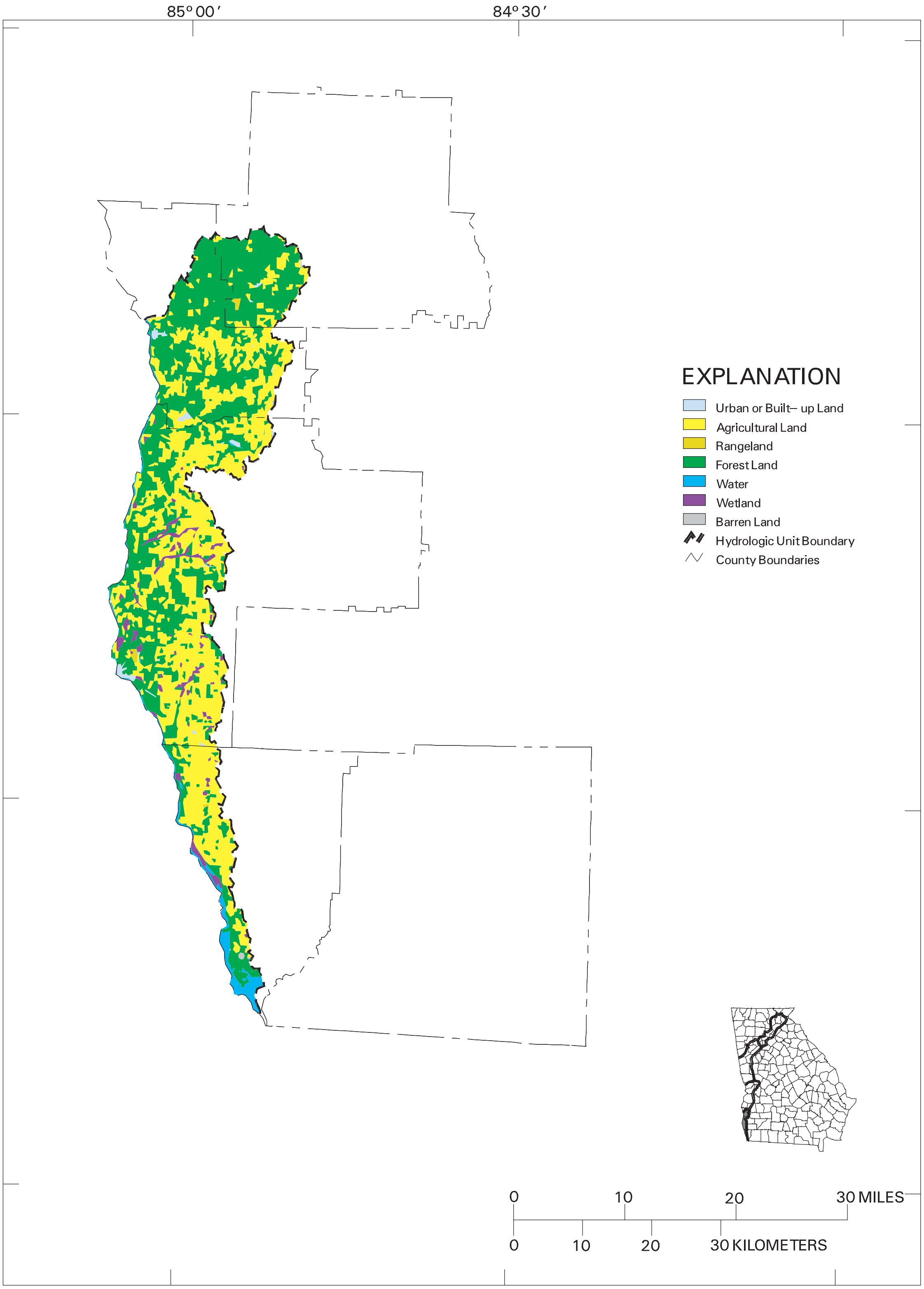


Figure 2-15. Land Use, Lower Chattahoochee River Basin, HUC 03130003, USGS 1972-76 Classification Updated with 1990 Urban Areas

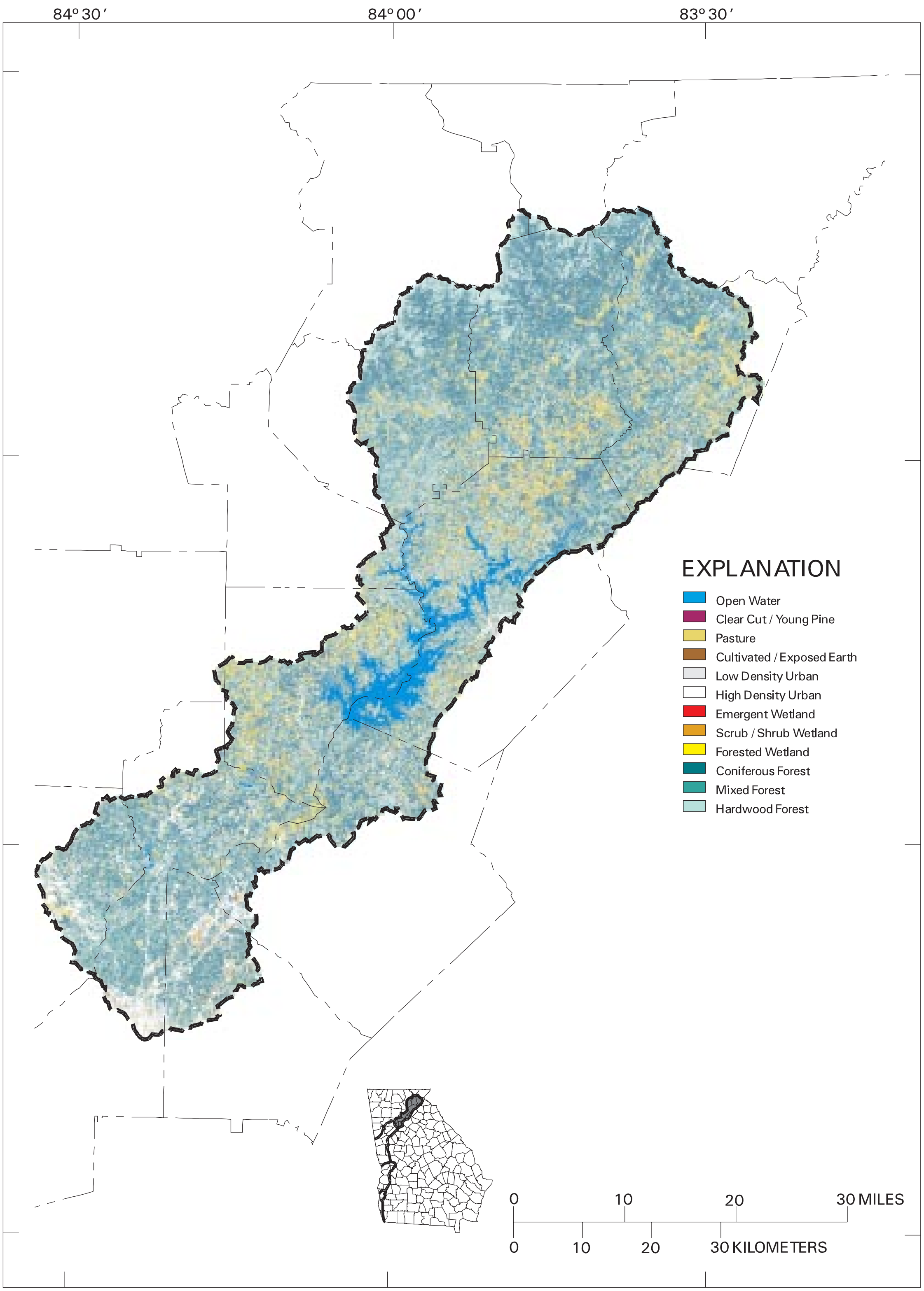


Figure 2-16. Land Cover 1990, Upper Chattahoochee River Basin, HUC 03130001

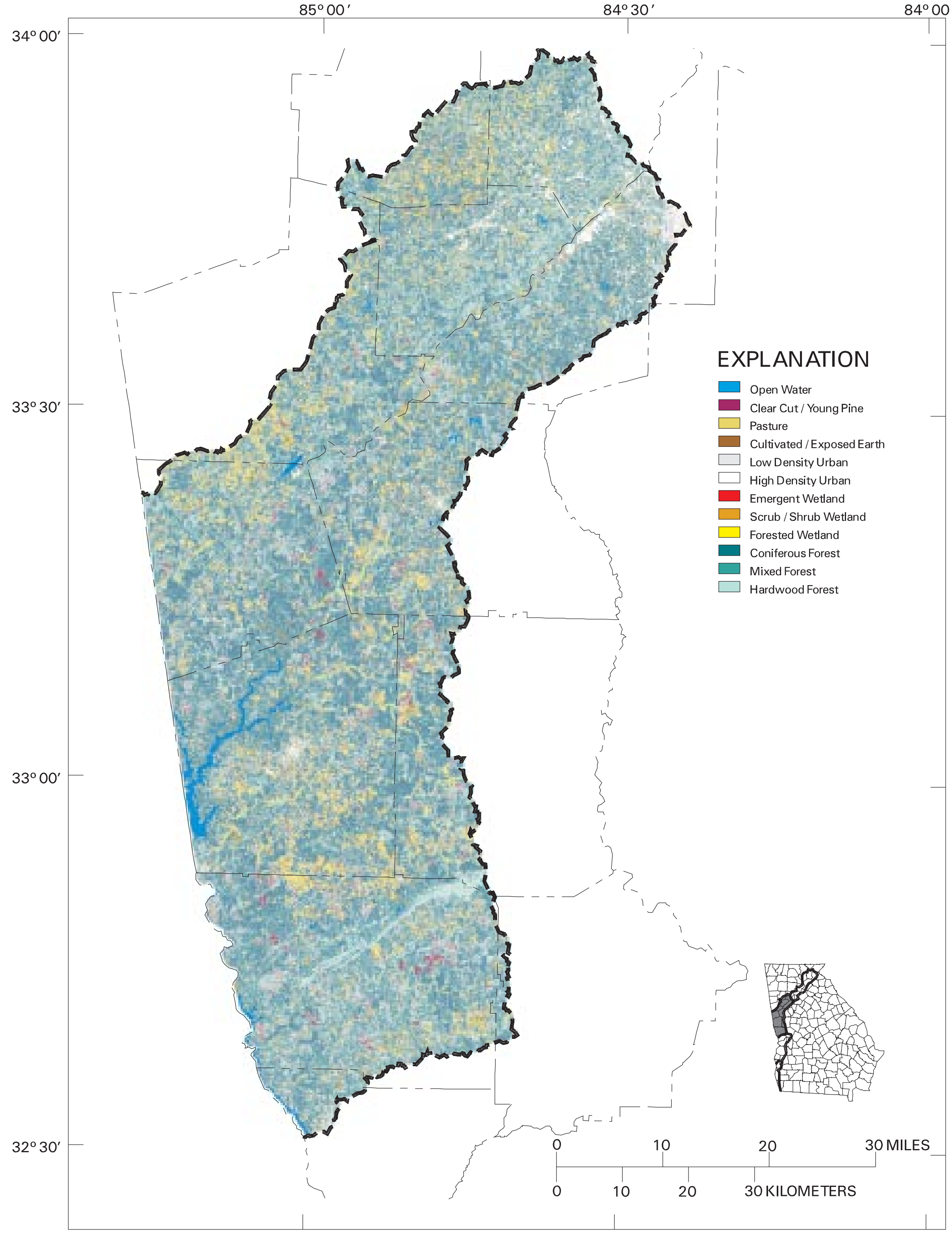


Figure 2-17. Land Cover 1990, Middle Chattahoochee River Basin, HUC 03130002

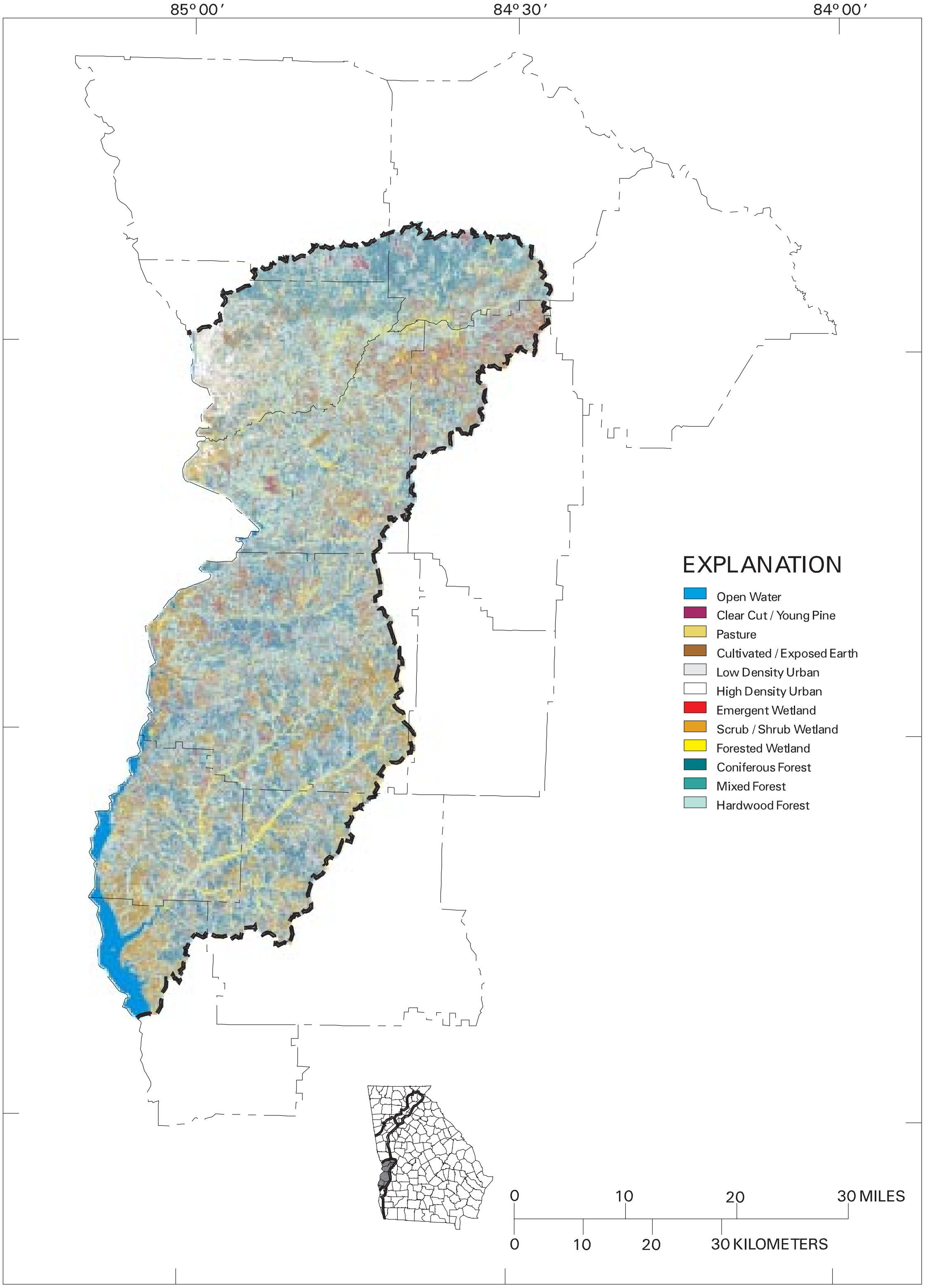


Figure 2-18. Land Cover 1990, Middle Chattahoochee River Basin, HUC 03130003

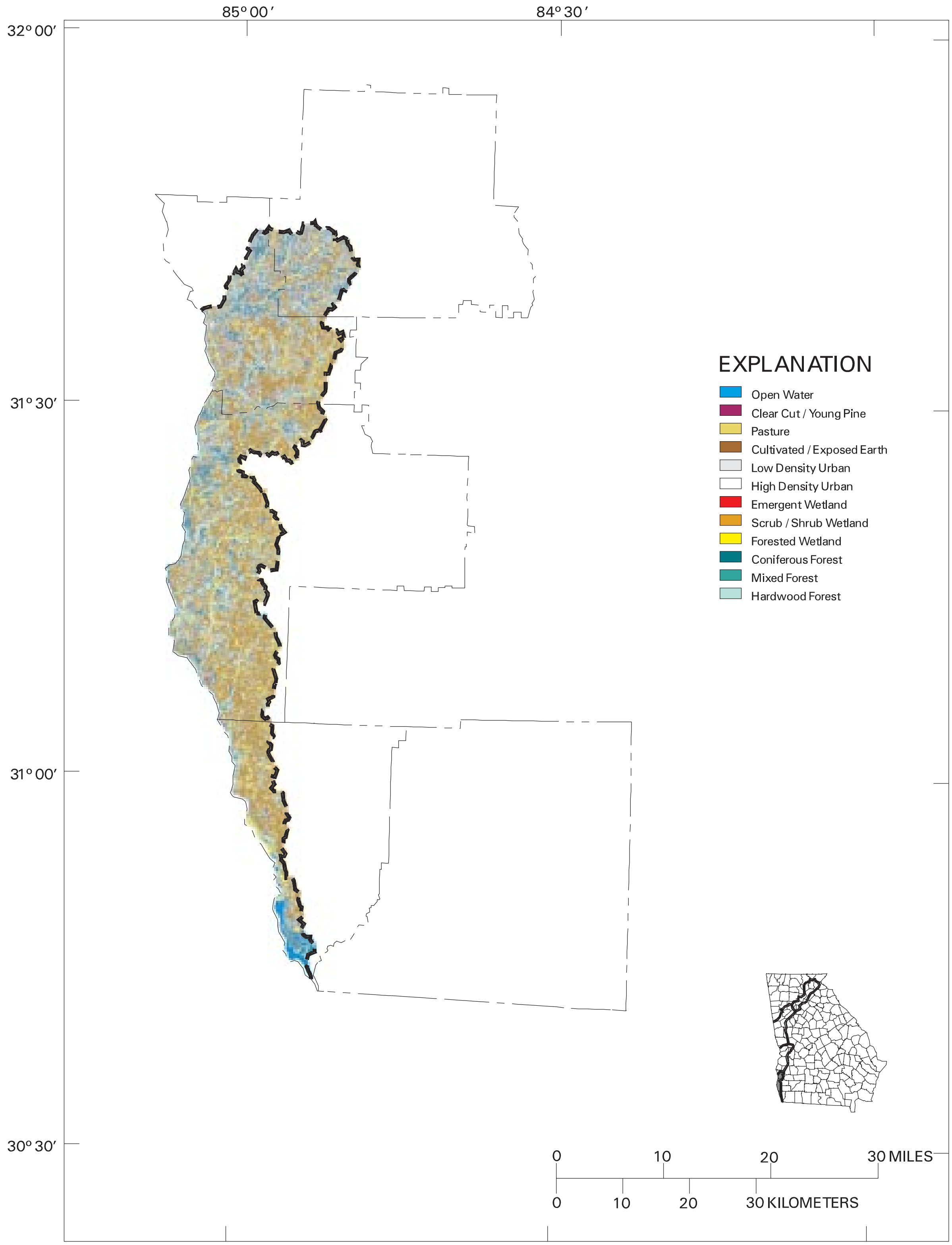


Figure 2-19. Land Cover 1990, Lower Chattahooche River Basin, HUC 03130004

Table 2-5. Landcover Statistics for the Chattahoochee Basin

Class Name	%	Acres
Open Water	2.9	110,939.8
Clear Cut/Young Pine	4.4	170,860.2
Pasture	8.3	318,762.6
Cultivated/Exposed Earth	8.2	313,544.0
Low Density Urban	3.1	120,863.7
High Density Urban	1.6	60,383.2
Emergent Wetland	0.2	5,654.8
Scrub/Shrub Wetland	0.2	7,001.9
Forested Wetland	1.7	64,037.9
Coniferous Forest	21.2	816,271.5
Mixed Forest	22.3	859,295.5
Hardwood Forest	25.5	979,244.6
Salt Marsh	0.0	0.0
Brackish Marsh	0.0	0.0
Tidal Flats/Beaches	0.0	0.0
Total	*100.0*	*3,847,560.0*

of the forest land. Commercial silvicultural land use is concentrated in the Piedmont south of Atlanta and in the Coastal Plain just below the Fall Line (Figure 2-20).

Forestry is a major part of the economy within the basin. Markets for forest products afford landowners excellent investment opportunities to manage and sell their timber, pine straw, naval stores, etc., products. Statewide, the forest industry output for 1996 grew to approximately $ 17.3 billion dollars. The value added by this production, which includes wages, profits, interest, rent, depreciation and taxes paid into the economy reached a record high $ 7.9 billion dollars. Georgians are benefitted directly by 177,000 job opportunities created by the manufacture of paper, lumber, furniture and various other wood products as well as benefitting the consumers of these products.

Other benefits of the forest include hunting, fishing, aesthetics, wildlife watching, hiking, camping and other recreational opportunities as well as providing important environmental benefits such as clean air and water and wildlife habitat. Since 1982, there has been a statewide trend of loss of forest acreage, resulting from both conversion to urban and related uses and clearing for agricultural uses. Within the basin itself, since 1982 the area classified as pine type (plantation and natural) has decreased 250,645 acres (13 percent) from 1,870,334 acres to 1,619,689 acres. The area classified as oak-pine type increased 72,726 acres (13 percent) from 540,211 acres to 612,937 acres. Upland hardwood acreage increased 62,478 acres (4.8 percent) from 1,299,513 acres to 1,361,991 acres. Bottomland hardwood acres increased 10,478 acres (3.4 percent) from 305,922 acres to 316,400 acres.

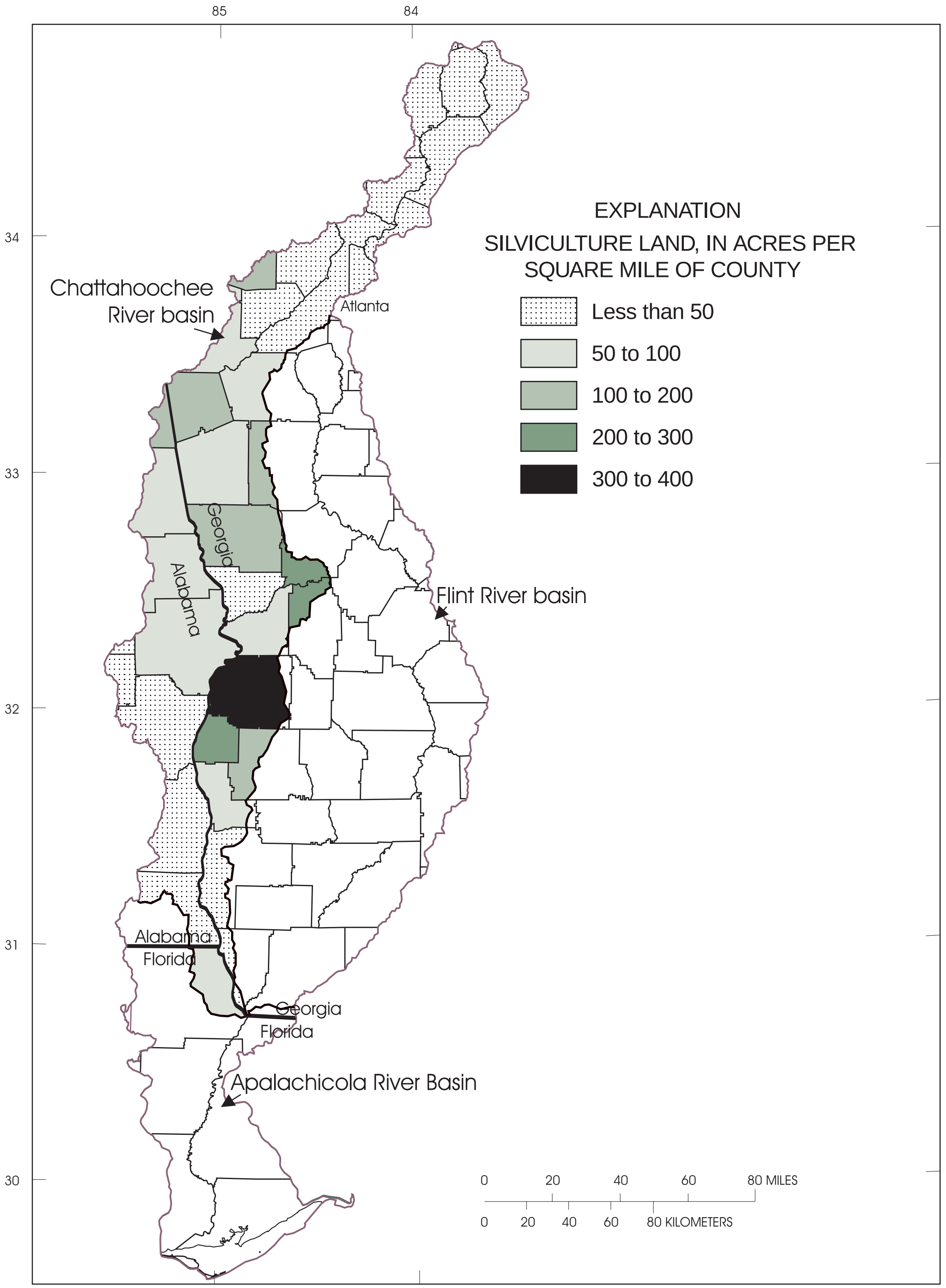


Figure 2-20. Silvicultural Land in the Chattahoochee River Basin (modified from Couch et al, 1996)

Agriculture

Despite the rapid growth of urban areas, agriculture continues to play an important role in the local economy, particularly in the southern and northern ends of the Chattahoochee basin. Agricultural operations in the basin include poultry, milk, and beef production, along with crop, orchard, and vegetable production. Row crops dominate agricultural land use in the Coastal Plain Province. The dominant agricultural land uses in the Piedmont Province are pasture and confined feeding for poultry and livestock production, and hay production.

Total farmland in the Chattahoochee River Basin (Figure 2-21) has decreased every agricultural census year from 1974 to 1987 (U.S. Bureau of the Census, 1981a,b,c; 1989a,b,c), totaling 461,456 acres in 1987. However, poultry production has been increasing during that same period. In 1991, approximately 170 million broiler chickens, 116 thousand cattle, and 51 thousand swine were produced in the basin (see Table 2-6). Most poultry production is concentrated in the upper part of the Chattahoochee River Basin above Lake Sidney Lanier in Hall, White, and Habersham Counties, Georgia.

Crops with the largest harvested acreage include peanuts, corn, soybeans, and cotton. Other important crops include wheat, hay, vegetables, and tobacco. In 1987, another 3000 acres were planted in orchards. The ranking of harvested acres among these crops varies from year to year in response to market conditions, government subsidy programs, and the weather.

2.3 Local Governments and Planning Authorities

Many aspects of basin management and water quality depend on decisions regarding zoning, land use, and land management practices. These are particularly important for the control of nonpoint pollution — pollution which arises in stormwater runoff from agriculture, urban or residential development, and other land uses. The authority and responsibility for planning and control of these factors lies with local governments, making local governments and jurisdictions important partners in basin management.

The **Department of Community Affairs** (DCA) is the state's principal department with responsibilities for implementing the coordinated planning process established by the Georgia Planning Act. Responsibilities include promulgation of minimum standards for preparation and implementation of plans by local governments, review of local and regional plans, certification of qualified local governments, development of a state plan, and provision of technical assistance to local governments. Activities under the Planning Act are coordinated with the EPD, Regional Development Centers and local governments.

2.3.1 Counties and Municipalities

Local governments in Georgia consist of counties and incorporated municipalities. As entities with Constitutional responsibility for land management, local governments have a significant role in the management and protection of water quality. The role of local governments includes enacting and enforcing zoning, stormwater and development ordinances; undertaking water supply and wastewater treatment planning, participating in programs to protect wellheads and significant groundwater recharge areas. Many local governments are also responsible for operation of water supply and wastewater treatment facilities.

The Chattahoochee Basin includes part or all of 32 Georgia counties (Table 2-7 and Figure 2-2); however, only six counties are entirely within the basin, and five counties have an insignificant

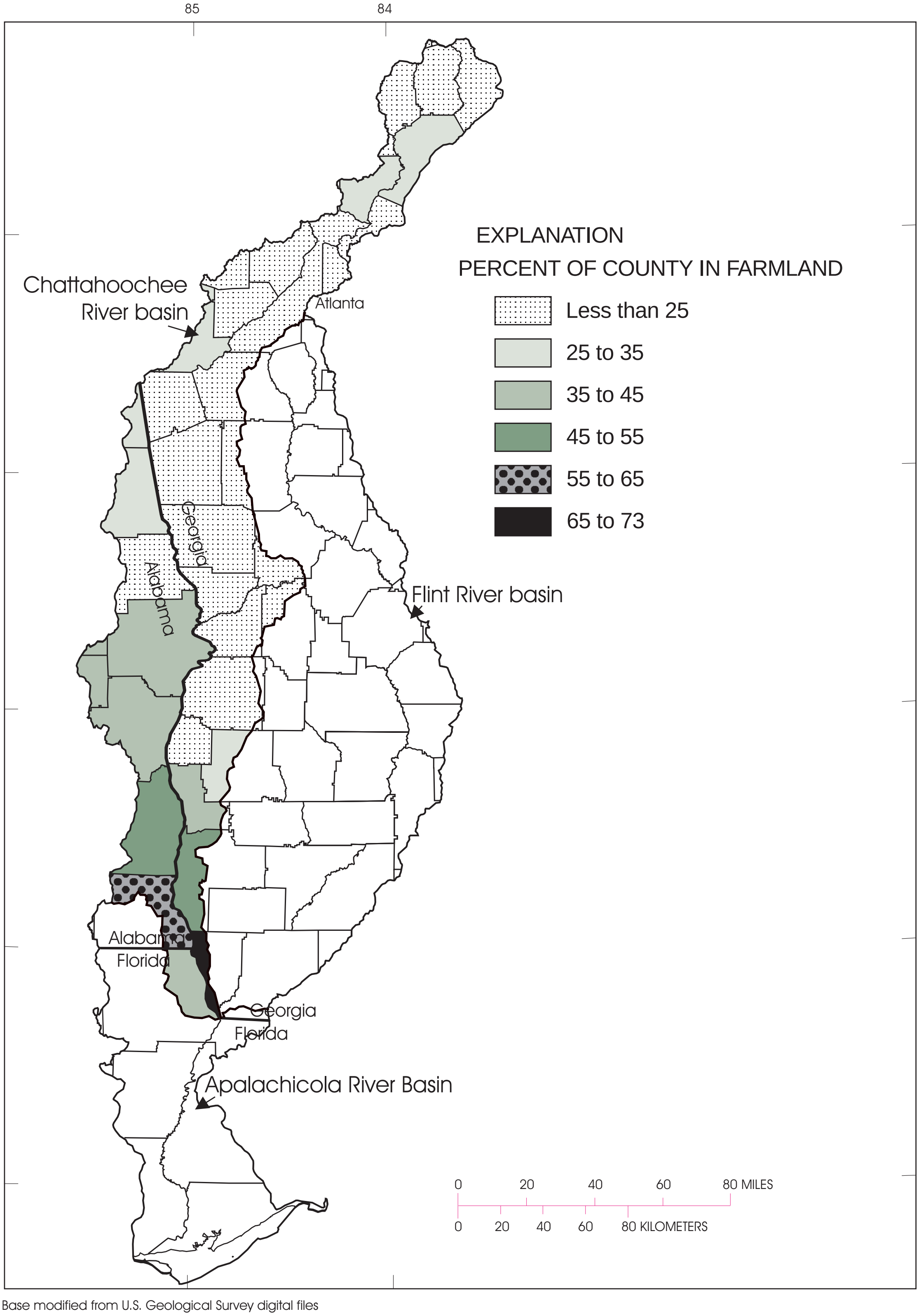


Figure 2-21. Agricultural Land in the Chattahoochee River Basin (modified from Couch et al., 1996)

Table 2-6. Agricultural Operations in the Chattahoochee River Basin, 1987-1991 (data supplied by NRCS)

Element	HUC 03130001	HUC 03130002	HUC 03130003	HUC 03130004	Total for Basin
Dairy Cows	3,125	6,328	0	451	9,904
Beef Cows	38,288	43,054	10,200	14,342	105,884
Hogs	20,840	6,007	16,521	7,151	50,519
Layer Hens (millions)	1.24	0	0.002	0	1.24
Broilers (millions)	165.69	0.53	1.21	3.00	170.43
Row Crops (acres)	17,562	18,167	36,620	52,077	124,426
Orchard (acres)	382	847	941	820	2,990
Hay (acres)	29,729	51,017	6,859	7,495	95,100
Total Agriculture (acres)	108,370	166,071	80,281	106,734	461,456

fraction of their land area within the basin. There are thus a total of 27 counties with significant jurisdictional authority in the basin. Municipalities or cities are communities officially incorporated by the General Assembly. Georgia has over 530 municipalities. Table 2-8 lists the

Table 2-7. Georgia Counties in the Chattahoochee River Basin

Counties Entirely within the Chattahoochee Basin	Counties Partially within the Chattahoochee Basin	Counties with Insignificant Area within the Basin
White	Habersham	Union
Douglas	Lumpkin	Towns
Troup	Hall	Dawson
Harris	Forsyth	Cherokee
Muscogee	Gwinnett	Clayton
Quitman	DeKalb	
	Cobb	
	Fulton	
	Paulding	
	Carroll	
	Heard	
	Coweta	
	Meriwether	
	Talbot	
	Chattahoochee	
	Marion	
	Stewart	
	Randolph	
	Clay	
	Early	
	Seminole	

Table 2-8. Georgia Municipalities in the Chattahoochee River Basin

Acworth	College Park	Gainesville	Norcross
Alpharetta	Columbus	Geneva	Oakwood Palmetto
Alto	Cornelia	Georgetown	Palmetto
Atlanta	Cumming	Grantville	Pine Mountain
Austell	Cusseta	Hamilton	Powder Springs
Baldwin	Dahlonega	Helen	Richland
Berkeley Lake	Decatur	Hiram	Roswell
Bibb City	Demorest	Hogansville	Shiloh
Blakely	Doraville	Jakin	Smyrna
Bluffton	Douglasville	LaGrange	Sugar Hill
Buford	Duluth	Lithia Springs	Suwanee
Centralhatchee	East Point	Lumpkin	Union City
Chamblee	Ephesus	Marietta	Villa Rica
Clarkesville	Fairburn	Moreland	Waverly Hall
Clarkston	Flowery Branch	Mount Airy	West Point
Clermont	Fort Gaines	Mountain Park	Whitesburg
Cleveland	Franklin	Newnan	

municipalities in the basin. RDCs including counties within the Chattahoochee Basin are summarized in Table 2-9.

2.3.2 Regional Development Centers

Regional Development Centers are agencies of local governments, with memberships consisting of all the cities and counties within each RDC's territorial area. There are currently 17 RDCs in Georgia. RDCs facilitate coordinated and comprehensive planning at local and regional levels, assist their member governments with conformity with minimum standards and procedures, and can have a key role in promoting and supporting management of urban runoff, including watershed management initiatives. RDCs also serve as liaisons with state and federal agencies for local governments in each region. Funding sources include members' dues and funds available through DCA.

Table 2-9. Regional Development Centers in the Chattahoochee River Basin

Regional Development Center	Member Counties with Land Area in the Chattahoochee Basin
Georgia Mountains RDC	Dawson, Forsyth, Habersham, Hall, Lumpkin, Towns, Union, White
Atlanta Regional Commission	Cherokee, Clayton, Cobb, DeKalb, Douglas, Fulton, Gwinnett
Coosa Valley RDC	Paulding
Chattahoochee Flint RDC	Carroll, Coweta, Heard, Meriwether, Troup
Lower Chattahoochee RDC	Chattahoochee, Clay, Harris, Muscogee, Quitman, Randolph, Stewart, Talbot
Middle Flint RDC	Marion
Southwest Georgia RDC	Early, Seminole

Of these seven RDCs, the Atlanta Regional Commission has a special role in managing water quality in the Chattahoochee, since this region is the source of the majority of wastewater and urban stormwater input to the basin. The Atlanta Regional Commission is the regional development center serving the 10-county Atlanta region. The region includes the City of Atlanta and 63 other cities. ARC's enabling legislation directs the agency to research, study and prepare plans for the control of water pollution and the Commission provides a forum where leaders come together to discuss and act on issues of region-wide consequence. ARC and Georgia Mountains RDC have been granted specific authority for management of development in the Chattahoochee River corridor under the Metropolitan Rivers Protection Act.

2.4 Water Use Classifications

2.4.1 Georgia's Water Use Classification System

The Board of Natural Resources was authorized through the Rules and Regulations for Water Quality Control promulgated under the Georgia Water Quality Control Act of 1964, as amended, to establish water use classifications and water quality standards for the surface waters of the State.

The water use classifications and standards were first established by the Georgia Water Quality Control Board in 1966. Georgia was the second state in the nation to have its water use classifications and standards for intrastate waters approved by the federal government in 1967. For each water use classification, water quality standards or criteria were developed which established a framework to be used by the Water Quality Control Board and later the Environmental Protection Division in making water use regulatory decisions.

The water use classification system was applied to interstate waters in 1972 by the EPD. Georgia was again one of the first states to receive federal approval of a statewide system of water use classifications and standards. Table 2-10 provides a summary of water use classifications and criteria for each use.

Table 2-10. Georgia Water Use Classifications and Instream Water Quality Standards for Each Use

	Bacteria (fecal coliform)		**Dissolved Oxygen (other than trout streams)[2]**		**pH**	**Temperature (other than trout streams)[2]**	
Use Classification[1]	30-Day Geometric Mean[3] (no/100 ml)	Maximum (no./100ml)	Daily Average (mg/l)	Minimum (mg/l)	Std. Units	Maximum Rise above Ambient (°F)	Maximum (°F)
Drinking Water requiring treatment	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Recreation	200 (Freshwater) 100 Coastal)	--	5.0	4.0	6.0-8.5	5	90
Fishing Coastal Fishing[4]	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Wild River	No alteration of natural water quality						
Scenic River	No alteration of natural water quality						

1 Improvements in water quality since the water use classifications and standards were originally adopted in 1972 provided the opportunity for Georgia to upgrade all stream classifications and eliminate separate use designations for "Agriculture", "Industrial", "Navigation", and "Urban Stream" in 1993.
2 Standards for Trout Streams for dissolved oxygen are an average of 6.0 mg/l and a minimum of 5.0 mg/l. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2°F is allowed in Secondary Trout Streams.
3 Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.
4 Standards are same as fishing with the exception of dissolved oxygen which is site specific.

Congress made changes in the CWA in 1987 that required each state to adopt numeric limits for toxic substances for the protection of aquatic life and human health. To comply with these requirements, the Board of Natural Resources adopted 31 numeric standards for protection of aquatic life and 90 numeric standards for the protection of human health. Appendix B provides a summary of toxic substance standards that apply to all waters in Georgia. Water quality standards are discussed in more detail in Section 5.2.1.

In the latter 1960s through the mid-1970s there were many water quality problems in Georgia. Many stream segments were classified for the uses of navigation, industrial, or urban stream. Major improvements in wastewater treatment over the years have allowed the stream segments to be raised to the uses of fishing or coastal fishing which include more stringent water quality standards. The final two segments in Georgia were upgraded as a part of the triennial review of standards completed in 1989. All of Georgia's waters are currently classified as either fishing, recreation, drinking water, wild river, scenic river, or coastal fishing.

2.4.2 Water Use Classifications for the Chattahoochee River Basin

Waters in the Chattahoochee River Basin are classified as either fishing, recreation, or drinking water. The majority of the waters are classified as fishing. Those waters classified as drinking water or recreation are shown in Table 2-11. A number of waters in the northern portion of the Chattahoochee River basin are also designated as primary or secondary trout streams, as shown in Table 2-12.

Table 2-11. Chattahoochee River Basin Waters Classified as Drinking Water or Recreation[1]

Waterbody	Description of Segment	Use Classification
Chattahoochee River	Headwaters to Buford Dam	Recreation
Chattahoochee River	Buford Dam to Atlanta (Peachtree Creek)	Drinking Water and Recreation
Chattahoochee River	Atlanta (Peachtree Creek) to Cedar Creek	Fishing[2]
Chattahoochee River	New River to West Point Dam	Recreation
Chattahoochee River	West Point Dam to West Point Mfg. Company Water Intake	Drinking Water
Chattahoochee River	Osanippa Creek to Columbus (North Highland Dam)	Recreation and Drinking Water
Chattahoochee River	Cowikee Creek to Great Southern Division of Great Northern Paper Company	Recreation
Chattahoochee River	Georgia Hwy. 91 (Neal's Landing) to Jim Woodruff Dam	Recreation
Big Creek	Georgia Hwy. 400 to City of Roswell Water Intake	Drinking Water
Dog River	Headwaters to Dog River Reservoir	Drinking Water
Bear Creek	Headwaters to Douglasville-Douglas County Water and Sewer Authority Water Intake	Drinking Water

Notes: 1. Waters within the Chattahoochee River Basin not listed above are classified as Fishing.
2. Specific criteria apply at all times when the river flow measured at a point immediately upstream from Peachtree Creek equals or exceeds 750 cfs (Atlanta gage flow minus Atlanta water supply withdrawals).

Table 2-12. Chattahoochee River Basin Waters Designated as Trout Stream

County	Classification	Description of Segment
Cobb	Secondary	Chattahoochee River upstream from I-285 West Bridge
Forsyth	Secondary	Chattahoochee River
Fulton	Secondary	Chattahoochee River upstream from I-285 West Bridge
Gwinnett	Secondary	Chattahoochee River
Habersham	Primary	Chattahoochee River watershed upstream from Georgia Hwy. 255 Bridge
	Primary	Soque River watershed upstream from King's Bridge (bridge on Georgia Hwy. 197 just below the mouth of Shoal Creek)
	Secondary	Chattahoochee River watershed upstream from Georgia Hwy. 115 to the Georgia Hwy. 255 bridge.
	Secondary	Soque River watershed upstream from the mouth of Deep Creek to King's Bridge.
Lumpkin	Primary	Cane Creek watershed upstream from Cane Creek Falls.
	Primary	Cavender Creek watershed.
	Primary	Chestatee River watershed upstream from Lumpkin County Road 52-S976.
	Primary	Clay Creek Watershed
	Secondary	Cane Creek watershed upstream from Georgia Hwy. 52 Bridge to Cane Creek Falls.
	Secondary	Chestatee River watershed upstream from the mouth of Tesnatee Creek to Lumpkin County Road 52-S976.
	Secondary	Yahoola Creek watershed upstream from Georgia Hwy. 52.
Paulding	Secondary	Powder Creek watershed.
Towns	Primary	Chattahoochee River watershed.
Union	Primary	Chattahoochee River watershed.
White	Primary	Cathey Creek watershed upstream from the Arrowhead Campground Lake.
	Primary	Chattahoochee River watershed upstream from Georgia Hwy. 255 Bridge.
	Primary	Town Creek watershed upstream from the mouth of Jenny Creek.
	Secondary	Chattahoochee River watershed upstream from Georgia Hwy. 115 to the Georgia Hwy. 255 Bridge.
	Secondary	Little Tesnatee Creek watershed upstream from the mouth of Turner Creek.
	Secondary	Turner Creek watershed except as listed under primary above (Turner Creek nearest to Cleveland city limits).

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Section 3

Water Quantity

This section addresses water quantity issues (availability and use), while water quality in the Chattahoochee basin is the subject of Section 4. Water use in the Chattahoochee River Basin is measured by estimates of freshwater withdrawn from ground and surface water sources, while water availability is assessed based on annual surface water flows and ground water storage. Saline water is not used in the basin. Uses of water include both consumptive uses (in which the water is no longer available to the basin) and non-consumptive uses (in which the water is returned to the basin after use). About 20 percent of total Municipal and Industrial (M&I) water withdrawals in 1990 was not returned to surface or ground water sources, primarily due to evaporative losses.

Surface water is the primary water source in the Piedmont Province of the Chattahoochee River Basin because ground water yields from crystalline rock aquifers tend to be low. Within the Coastal Plain province, aquifer yields are higher and ground water withdrawals are an important part of the total water budget. Although most public-supply withdrawals in the Piedmont Province are from surface-water sources, with the exception of counties near or immediately below the Fall Line, most public-supply water in the Coastal Plain comes from ground water sources. The Floridan aquifer system supplied most of the ground water used in the basin in 1990, followed by the Claiborne, Clayton, Piedmont crystalline rock, and the Providence aquifer systems. As previously mentioned, the two sources of supply are not independent, because ground water discharge to streams is important in maintaining dry-weather flow. Thus, withdrawal of ground water can, under certain conditions, also result in reduction in surface water flow.

Water use in the Chattahoochee basin is increasing, resulting in greater demands on what are essentially finite supplies. Total water withdrawals in the Apalachicola-Chattahoochee-Flint basin increased by 42 percent between 1970 and 1990 (Couch et al., 1996). During this period, total surface-water withdrawals increased by 29 percent; however, ground water withdrawals increased by 240 percent.

In the following sections, water availability is discussed from a number of viewpoints. First, the important topic of drinking water is presented, which includes both surface and ground water supplies. Then, general surface water availability is presented, followed by ground water availability.

3.1 Drinking Water Supply

3.1.1 Drinking Water Sources

Chattahoochee River Basin water is the most utilized surface water source for drinking water in Georgia. The Chattahoochee River, and tributaries, serve a majority of the Atlanta metropolitan population including Fulton, DeKalb, Gwinnett, Forsyth, Douglas and Cobb counties, as well as the city of Columbus. Most surface water intakes are located on the Chattahoochee River, smaller tributaries and Lake Lanier. Communities located in the headwater area of the basin and below Columbus utilize ground water pumped from wells as a source of drinking water. The locations of surface water intakes within each of the four Hydrologic Units of the Chattahoochee River Basin are shown in Figures 3-1 through 3-4.

The Chattahoochee River Basin provides drinking water for nearly 3 million people in the state of Georgia by municipal or privately owned public water systems. A public water system pipes water for human consumption and has at least 15 service connections or regularly serves at least 25 individuals 60 or more days out of the year. Public water system sources include surface water pumped from rivers and creeks or ground water pumped to the surface from wells or naturally flowing from springs. There are three different types of public water systems: community, non-community non-transient, and non-community transient.

A community public water system serves at least 15 service connections used by year round residents or regularly serves at least 25 year-round residents. Examples of community water systems are municipalities, such as cities, counties, and authorities which serve residential homes and businesses located in the areas. Other types of community public water systems include rural subdivisions or mobile home parks which have a large number of homes connected to a private public water system, usually a small number of wells.

A non-community non-transient public water system serves at least 25 of the same persons over six months per year. Examples of non-community non-transient systems are schools, office buildings, and factories which are served by a well.

A non-community transient public water system does not meet the definition of a non-community non-transient system. A non-community transient public water system provides piped water for human consumption to at least 15 service connections or which regularly serves at least 25 persons at least 60 days a year. Examples of a non-community transient are highway rest stops, restaurants, motels, and golf courses.

Private domestic wells serving individual houses are not covered by the state's public water system regulations. However, the regulations for drilling domestic wells are set by the Water Well Standards Act and the local health department is responsible for insuring water quality.

In the Chattahoochee River Basin there are approximately 56 community public water systems utilizing surface water and serving 2,872,087 people and 113 community public water systems utilizing ground water and serving approximately 45,889 people.

3.1.2 Drinking Water Demands

Drinking water demands are expected to increase due to the population growth in the Atlanta Metro area, especially in the subdivision communities in Gwinnett, Forsyth, Hall, Cobb and Douglas counties. Due to current and forecasted growth, many of the Atlanta metropolitan counties have adopted water conservation techniques, including ordinances for low flow household plumbing in new construction, limits on outside watering during the summer months, increased water rates to curb excess use, and public education. Projections of drinking water demand volumes are provided in Section 3.2 (surface water) and 3.3 (ground water).

3.1.3 Drinking Water Permitting

The Georgia Safe Drinking Water Act of 1977 and the Rules for Safe Drinking Water (391-3-5) adopted under the act require any person who owns and/or operates a public water system to obtain a permit to operate a public water system from the Environmental Protection Division.

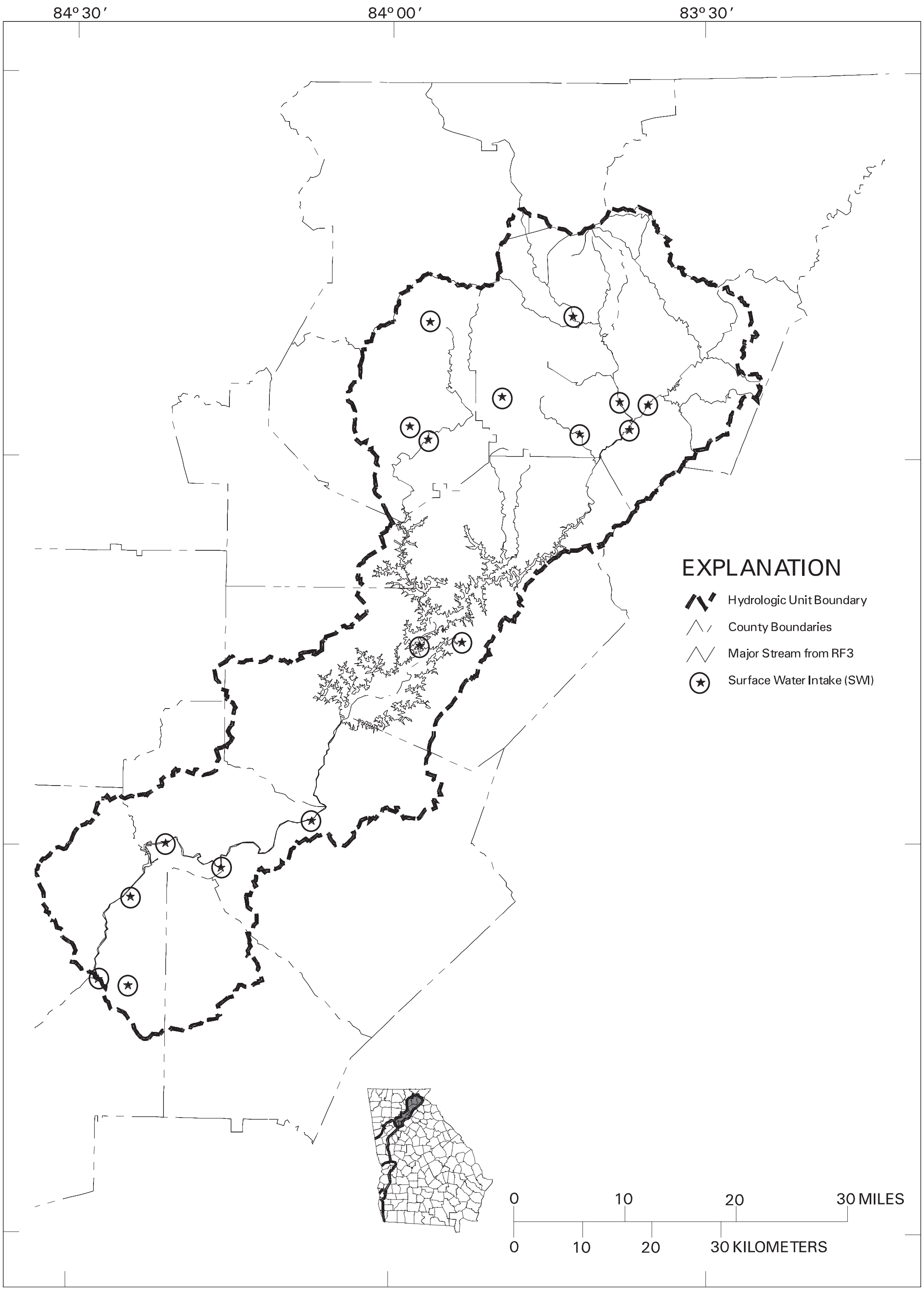

Figure 3-1. Surface Water Intakes, Upper Chattahoochee River Basin, HUC 03130001

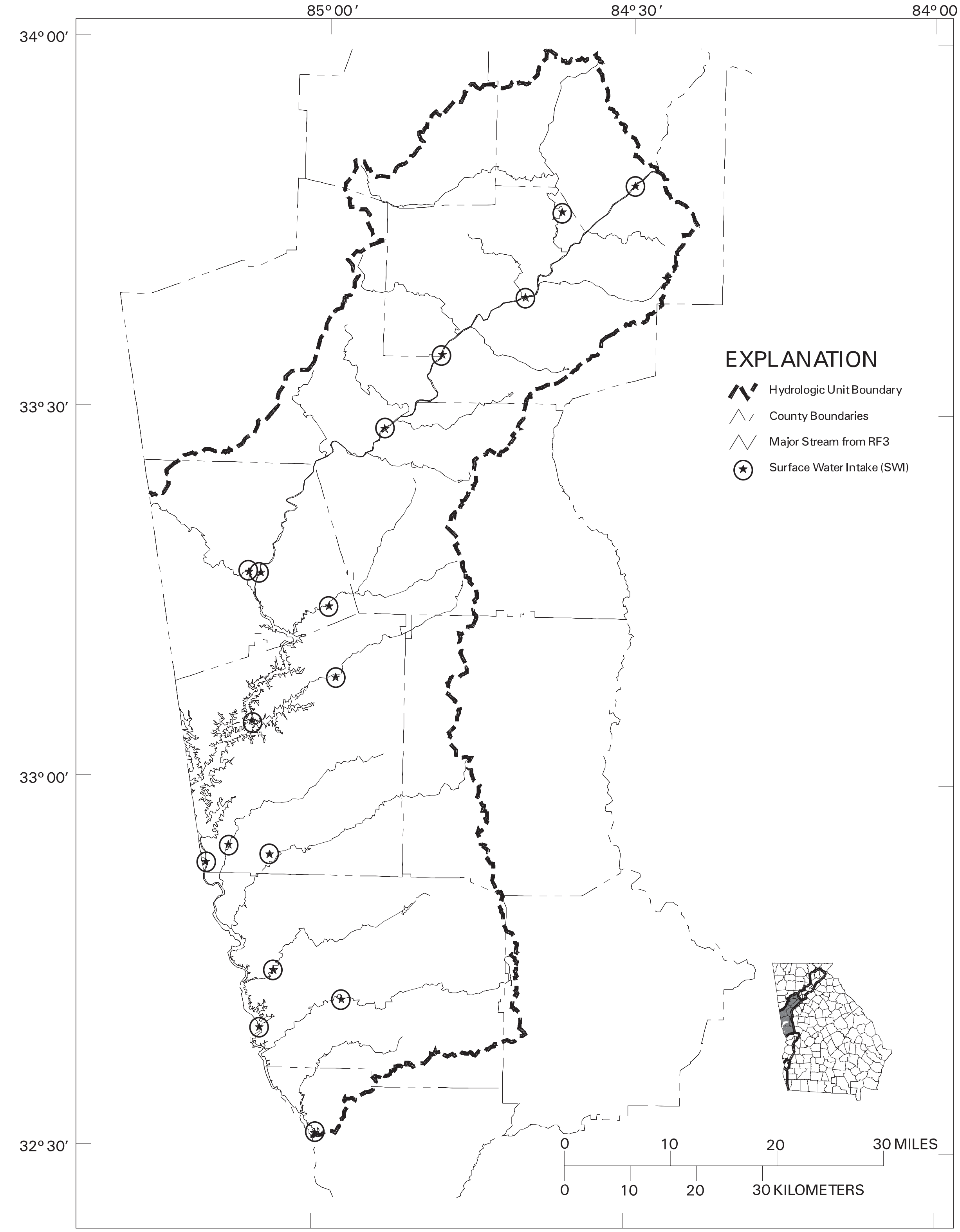

Figure 3-2. Surface Water Intakes, Middle Chattahoochee River Basin, HUC 03130002

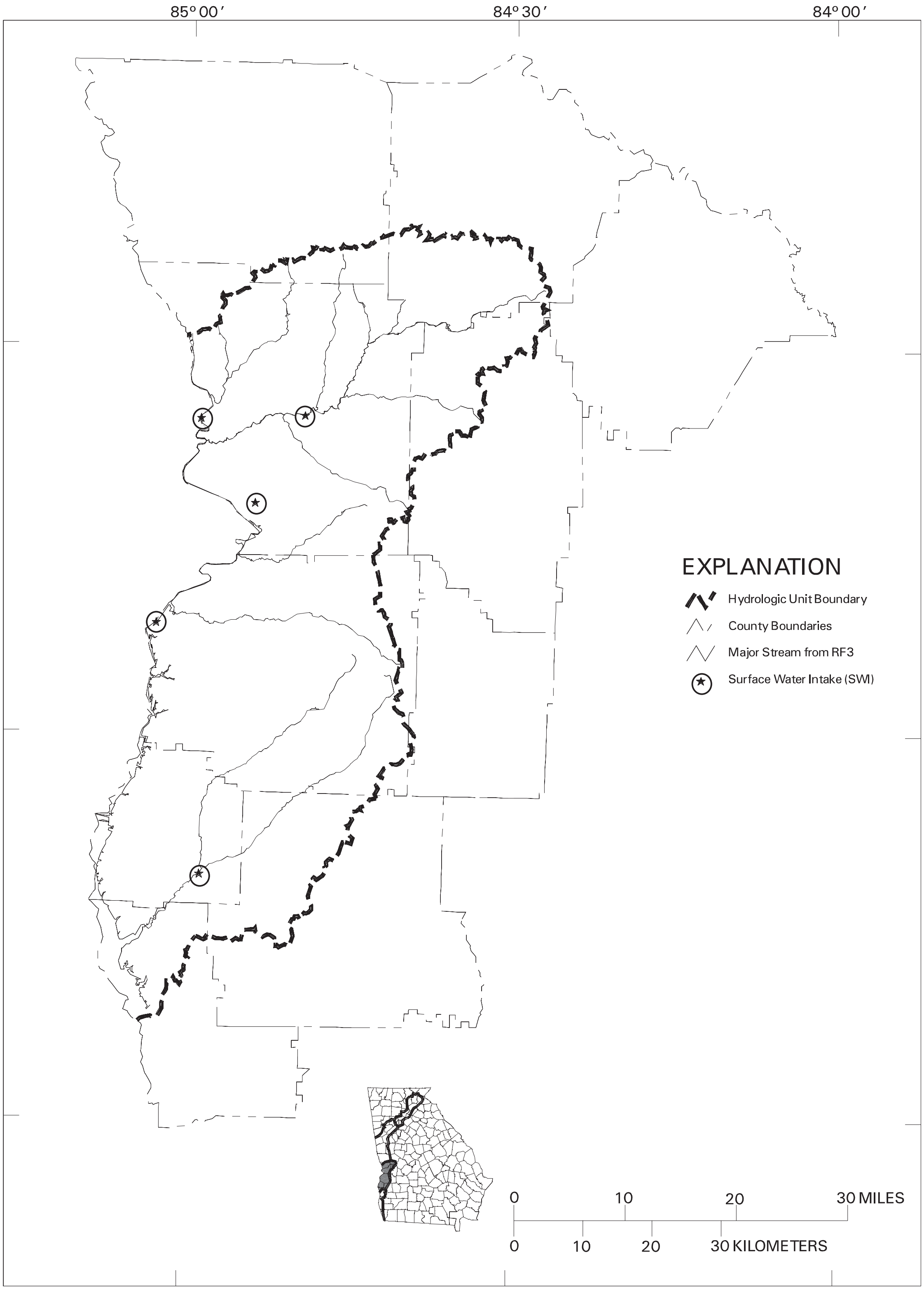

Figure 3-3. Surface Water Intakes, Middle Chattahoochee River Basin, HUC 03130003

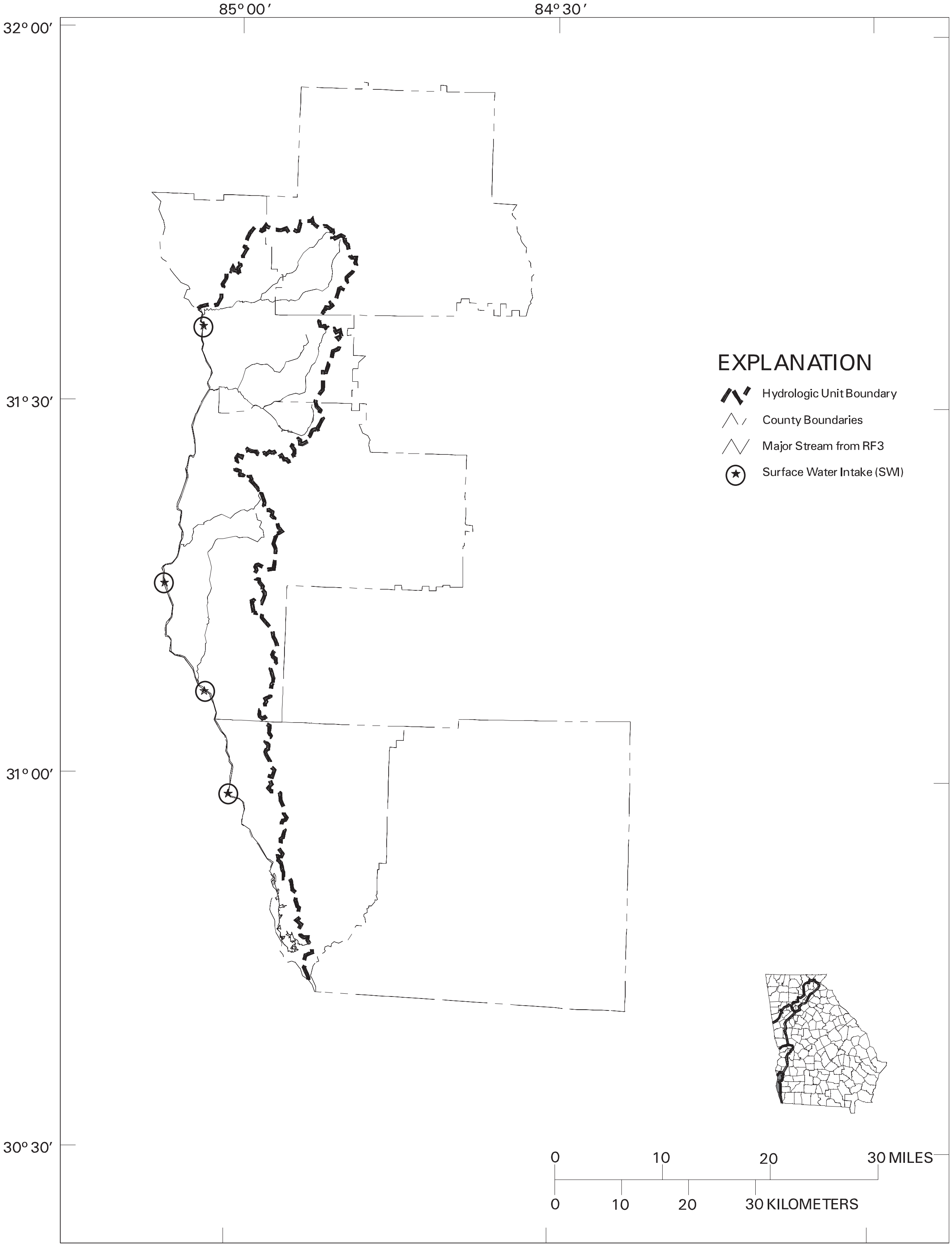

Figure 3-4. Surface Water Intakes, Lower Chattahoochee River Basin, HUC 03130004

The permitting process is set in three phases: Inquiry & Discovery, Technical Review and Permitting. During these phases the owner must provide detailed description of the project; demonstrate the reliability of water source site; render plans and specifications of demonstrating construction integrity of wells, plants and distribution system; conduct preliminary water sample testing; and submit legal documentation including application to operate a public water system. Permits contain specific conditions the owner must meet for different types of water sources, plants, and distribution systems, including list of approved water sources, filter rates, disinfection and treatment requirements, operator certification, documentation and reporting requirements, compliance with water sample testing schedule, and number of allowed service connections. Permits are issued for ten (10) years and are renewable. There are 332 active and permitted systems in the Chattahoochee River Basin.

Summary of EPD Drinking Water Program

The Federal Environmental Protection Agency (EPA) promulgates the rules and regulations for drinking water and passes the responsibility of enforcing the rules to the states with primacy, such as the state of Georgia. In Georgia, public water systems are regulated by the Drinking Water Program (DWP) of the Environmental Protection Division (EPD). The Drinking Water Program in the state of Georgia is divided into Drinking Water Compliance Program (DWCP) and Drinking Water Permitting Program (DWPP). Both programs oversee the 2618 public water systems in the state of Georgia, including the 332 public water systems in the Chattahoochee River Basin.

3.2 Surface Water Quantity

3.2.1 Surface Water Supply Sources

Surface water supplies in the Chattahoochee basin include water in rivers, ponds, and reservoirs, including a series of major impoundments on the Chattahoochee mainstem (see Section 2.1.4). Total median annual flow in the Chattahoochee past Andrews Lock and Dam is approximately 2.1×10^6 million gallons per year. Reservoirs provide a storage capacity within the basin of approximately 1.2×10^6 million gallons.

3.2.2 Surface Water Supply Demands and Uses

Municipal and Industrial Demand

Municipal and industrial (M&I) water demands include public supplied and private supplied residential, commercial, governmental, institutional, industrial, manufacturing, and other demands such as distribution system water losses. Total M&I water demand in the Georgia part of the Chattahoochee basin (exclusive of power generation cooling water) is expected to increase from 435 million gallons per day (MGD) in 1995 to 446 MGD in 2000 and to 462 MGD in 2005 (Davis et al., 1996) with passive conservation programs in place (see Table 3-1). These passive conservation measures include increases in water use efficiency resulting from recently implemented plumbing codes, the natural replacement of water fixtures, and known increases in water and wastewater prices since 1990. Additionally, in 1995 approximately 70 MGD was supplied from the Chattahoochee basin to regions outside the basin boundary. This demand is projected to increase to 75 MGD in 2000 and to 80 MGD in 2005.

Existing permits for municipal and industrial (non-agricultural) surface water withdrawals in the Chattahoochee River Basin are shown in Table 3-2 (including permits for power generation

Table 3-1: Projected Municipal and Industrial Water Demand, Chattahoochee River Basin

Year	Demand (MGD)	Percent Returned to River
1990	441	83%
1995	435	83%
2000	446	83%
2005	462	82%
2010	480	82%
2015	490	83%
2020	493	83%
2025	494	83%
2030	494	84%
2050	534	85%

cooling water). One-quarter of the non-power generation 1990 demand in the Chattahoochee basin is used in Fulton County. By 2050, this county demand is projected to increase to 31 percent of the total basin demand. In 1990, the residential sectors of the Chattahoochee basin used about the same amount of water as the manufacturing sector (36 percent and 38 percent, respectively). However, by 2050 the residential demand for water is projected to increase to 44 percent of demand in the Chattahoochee basin, while the demand for water by the manufacturing sector is projected to decline to 21 percent of the 2050 basin total demand.

Ninety-nine percent of the Chattahoochee basin M&I water demand in 2005 is projected to be supplied by surface water withdrawals (458 MGD). The ground water M&I withdrawals are projected to be only 4 MGD in the Chattahoochee basin.

Most of the M&I demand is not consumed, but is instead returned back to the Chattahoochee River Basin as treated waste water. In 2005 approximately 82 percent of the in-basin demand is projected to be returned to the river (see Table 3-1).

Agricultural Water Demand

In 1992 approximately 117,000 acres in the Georgia portion of the Chattahoochee River Basin were devoted to the production of crops, orchards, turf, nursery, and aquaculture, and 7,600 acres were irrigated. The number of irrigated acres in the Chattahoochee basin is expected to increase to 8,800 by year 2000.

The 1992 agricultural water demand for counties in the Piedmont part of the Chattahoochee River Basin (Georgia and Alabama) was 10,401 MG (50%) and for the Coastal Plain part of the Chattahoochee River Basin 10,394 MG (50% of the total; see Table 3-3). Within Georgia, about 70% of the demand is in the Piedmont section, due to the comparatively small land area of the basin contained within the Coastal Plain. More than half the Coastal Plain demand in the basin is from Alabama. The total agricultural water demand in the entire Chattahoochee River Basin is expected to increase from 21,000 MG (57 MGD) in 1992 to 27,000 MG (75 MGD) in 2000 and to 33,000 MG (92 MGD) in 2010 (NRCS, 1996).

Table 3-2. Permits for Surface Water Withdrawals in the Chattahoochee River Basin

Facility	Source	24 hr Max (MGD)	Mo. Avg (MGD)	County
Georgia Permits				
Fort Benning Water Treatment Plant	Upatoi River	12.00	10.00	Chattahoochee
Austell Box Board Company	Sweetwater Creek	1.20	0.94	Cobb
Cobb Co - Marietta Water Auth	Chattahoochee River	64.00	64.00	Cobb
Georgia Power Co - Atkinson	Chattahoochee River	432.00	432.00	Cobb
Georgia Power Co - McDonough	Chattahoochee River	394.00	394.00	Cobb
Sweetwater Paper Board Company	Sweetwater Creek	0.65	0.60	Cobb
Coweta County Commissioners	Wahoo Creek	1.00	0.85	Coweta
Georgia Power Co - Plant Yates	Chattahoochee River	720.00	700.00	Coweta
Newnan, City of	Sandy/Browns Creek	8.00	8.00	Coweta
McRae and Stolz, Inc.	Lake Lanier	0.78	0.50	Dawson
Dekalb Co Public Works - Water & Sewer	Chattahoochee River	140.00	140.00	Dekalb
Douglasville - Douglas County W & S	Anneewakee Creek	1.49	1.49	Douglas
Douglasville - Douglas County W & S	Dog River Reservoir	10.00	10.00	Douglas
Douglasville - Douglas County W & S	Dog River	8.00	8.00	Douglas
Douglasville - Douglas County W & S	Bear Creek	6.40	6.00	Douglas
East Point, City of	Sweetwater Creek	13.20	11.50	Douglas
Great Southern Paper Co.	Chattahoochee River	144.00	115.00	Early
Centex Real Estate Corporation	Man-made Lakes	0.75	0.50	Forsyth
Cumming, City of	Lake Sidney Lanier	21.00	18.00	Forsyth
Forsyth County Board of Commissioners	Lake Lanier	16.00	14.00	Forsyth
Lanier Golf Club	Golf Course Pond #1	0.29	0.21	Forsyth
Martin Marietta Aggregates - Buckhorn Quarry	Sump Pit	1.50	0.60	Forsyth
Atlanta Athletic Club	Chattahoochee River	0.86	0.43	Fulton
Atlanta, City of	Chattahoochee River	180.00	180.00	Fulton
Atlanta-Fulton Co. Water Res. Commission	Chattahoochee River	56.00	56.00	Fulton
Cherokee Town & Country Club	Bull Sluice Lake	0.72	0.43	Fulton
Fuji Development USA, Ltd.	Big Creek	2.00	1.00	Fulton
Olde Atlanta Golf Club, LP	Man Made Lakes	0.75	0.50	Fulton
Palmetto, City of	Cedar Creek	0.60	0.45	Fulton
Riverfarm Enterprises, Inc.	Johns Creek	1.15	0.50	Fulton
Roswell, City of - Big Creek	Big Creek	1.20	1.20	Fulton
Standard Golf Club	Unnamed Trib to Johns Cr.	0.75	0.60	Fulton

Table 3-2. (Continued)

Facility	Source	24 hr Max (MGD)	Mo. Avg (MGD)	County
Tattersall Club Corp	Chattahoochee River	0.25	0.25	Fulton
Buford, City of	Lake Sidney Lanier	2.50	2.00	Hall
Fulton County Board of Commissioners	Chattahoochee River	0.30	0.30	Gwinnett
Clarkesville City of	Soque River	1.50	1.00	Habersham
Cornelia, City of	Camp Cr, sup.big Hazel Cr	4.00	4.00	Habersham
Demorest, City of	Chattahoochee River	4.00	3.00	Habersham
Habersham Mills	Soque River	233.00	215.00	Habersham
Gainesville, City of	Lake Sidney Lanier	25.00	20.00	Hall
Gwinnett County Water & Sewerage Auth	Lake Sidney Lanier	120.00	105.00	Hall
Lake Lanier Islands Development Auth	Lake Sidney Lanier	0.60	0.60	Hall
Stouffer Pineisle Resort	Lake Sidney Lanier	0.60	0.60	Hall
Harris County Water Dept	Bartlett's Ferry Res	3.00	3.00	Harris
Wellington Sears Co. - Langdale Mill	Chattahoochee River	8.30	8.30	Harris
West Point Pepperell - Fairfax Mill	Chattahoochee River	4.00	3.50	Harris
West Point Pepperell - Service Ctr	Chattahoochee River	8.00	5.80	Harris
Franklin Aluminum Company, Inc.	Hillabahatchee Creek	0.10	0.04	Heard
Georgia Power Co - Plant Wansley	Service Water Reservoir	89.10	65.40	Heard
Georgia Power Company - Plant Wansley	Chattahoochee River	60.00	60.00	Heard
Heard County Water Authority	Centralhatchee Creek	2.00	1.50	Heard
Dahlonega, City of - New Plant	Yahoola Creek	1.00	0.75	Lumpkin
Dahlonega, City of - Old Plant	Yahoola Creek	0.50	0.50	Lumpkin
Columbus, City of	Lake Oliver	67.50	58.00	Muscogee
Continental Carbon	Chattahoochee River	0.30	0.22	Muscogee
Eagle & Phenix Hydro Project, Inc.	Chattahoochee River			Muscogee
Fieldcrest Mills, Inc. - Plant 1	Chattahoochee River	1.70	1.60	Muscogee
Fieldcrest Mills, Inc. - Plant 2	Chattahoochee River	2.60	2.40	Muscogee
Smiths Water Authority	Lake Oliver	4.00	4.00	Muscogee
Martin Marietta - Junction City Quarry	Pit Sump	2.30	0.24	Talbot
Hogansville, City of	Blue Creek Res	1.00	1.00	Troup
Lagrange, City of	West Point Lake	17.60	16.00	Troup
West Point, City of	Chattahoochee River	2.10	1.80	Troup
Cleveland, City of	Turner Creek	0.50	0.40	White
White County Water & Sewer Authority	Turner Creek	2.00	1.80	White

Table 3-2. (Continued)

Facility	Source	24 hr Max (MGD)	Mo. Avg (MGD)	County
Alabama Permits				
Chattahoochee Valley Water Supply District	Chattahoochee River	8.00		Chambers
Wellington Sears Langdale	Chattahoochee River	8.00		Chambers
SNC Farley Nuclear Plant	Chattahoochee River	140.00		Houston
Opelika Water Works Board	Halawakee Creek	6.00		Lee
Phenix City Utilities	Chattahoochee River	9.00		Lee
Smiths Water and Sewer Authority	Chattahoochee River	3.40		Lee
Mead Coated Board, Inc.	Chattahoochee River	12.50		Russell

Note: Permits are not required for withdrawals of less than 100,000 gallons per day on a monthly average.

In the Piedmont part of the Chattahoochee River Basin most agricultural water is for livestock and aquaculture, and is supplied from surface water. In the Coastal Plain part of the Chattahoochee River Basin most agricultural water is for crops and orchards, and ground water supplies 44 percent of this water demand. Unlike municipal, industrial, and cooling water withdrawals, practically none of the water withdrawn for agricultural use is returned to streams.

Sixteen power-generating plants located along the mainstem Chattahoochee River use the water resources of the basin (Figure 2-9), including eleven hydropower facilities, four fossil fuel generating facilities, and one nuclear plant (Couch et al., 1996). Two additional power-generating plants shown on Figure 2-9 are located at the outflow of Lake Seminole. Instream water use by the eleven hydroelectric plants constitutes nearly the entire flow within the river, except during flood conditions, but is nonconsumptive.

Of the 14 mainstem dams in the basin, only George W. Andrews Lock and Dam and City Mills are not operated for hydroelectric power production. The first power-generating dam was the Eagle-Phenix Dam, which was originally constructed in 1834 and reconstructed in 1865 to

Table 3-3. Agricultural Water Demand for the Chattahoochee River Basin

Year	Piedmont Chattahoochee	Coastal Chattahoochee	Total
1992	10401	10394	20795
1995	11266	13430	24696
2000	11849	15572	27421
2010	13001	20444	33445
2020	13625	23737	37362
2050	15755	36120	51875

(Georgia and Alabama) (MG per year, including crops/orchards, turf, nursery, livestock/poultry, and aquaculture demand, from NRCS, 1996, Based on Medium Demand Projections without Water Conservation) provide hydropower to the Eagle and Phenix Mill. Eight dams are located on the Chattahoochee River just north of Columbus to take advantage of the natural gradient at the Fall Line (Figure 2-9). The total hydroelectric generation capacity is 699,720 kilowatts in the ACF River basin (Fanning *et al.* , 1991).

Power Generation Water Demand

Water for thermoelectric-power generation is considered an off stream use of water, and generally is moderately consumptive to non-consumptive. Thermoelectric power is generated at four fossil-fuel plants and one nuclear power plant located in the Chattahoochee River Basin. Power generated at these plants totaled 33,460 gigawatts per hour and withdrew about 1650 MGD, most of which was returned to the river. Surface-water withdrawals for thermoelectric power generation decreased from 1980 to 1990 because of increased recirculation of cooling water. Thermal plants Farley, Yates, and Wansley on the Chattahoochee together consumed about 25 MGD in 1990. Other thermoelectric plants are essentially nonconsumptive.

Navigational Water Demand

Navigation has been an historical use of the Chattahoochee River Basin from Apalachicola Bay to the Fall Line. Before the Civil War, the city of Apalachicola, Florida was a major cotton port. Between 1828-60, 130 steamboats operated on the Chattahoochee, Flint, and Apalachicola Rivers (Owens, 1969). During the Civil War, the Apalachicola and Chattahoochee Rivers were of strategic significance to the Confederacy, and several Civil War naval battles occurred on the Chattahoochee River (Turner, 1988).

Federal support for navigation dates back to 1824, when the U.S. Army Corps of Engineers was authorized by Congress to maintain a navigational channel. The U.S. Rivers and Harbor Act of 1946 authorized the maintenance of a 9-foot deep and 100-foot wide channel from the mouth the Apalachicola River to Columbus, Ga., on the Chattahoochee River. A series of three navigation locks and dams are operated by the U.S. Army Corps of Engineers (Table 2-1). Walter F. George Lock and Dam, George W. Andrews Lock and Dam, and Jim Woodruff Lock and Dam are on the Chattahoochee River in the Coastal Plain Province.

The ability to use barges in the basin depends on having enough depth (at least 7 feet, and preferably 9 feet in the channel). Upstream of locks and dams, water depths can be maintained by replacing the water lost through lockage, evaporation, and reservoir releases. Below Jim Woodruff Lock and Dam, however, channel reliability on the Apalachicola River has been lower than predicted, and use of the channel dropped considerably during the 1980's when droughts frequently reduced channel depths.

Recreation

Because of proximity to the largest metropolitan area in the Southeast, the Chattahoochee and its reservoirs and tributaries are heavily used for recreation. The upper part of the Chattahoochee River Basin contains several heavily used reservoirs, national forests, and national and state parks. For example, Lake Sidney Lanier, located north of Atlanta, has more than 16 million visitors annually, and one of the highest visitation rates among U.S. Army Corps of Engineers reservoirs nationwide (U.S. Army Corps of Engineers, 1989).

The headwaters of the Chattahoochee River rise in the scenic mountains of northern Georgia and flow southwestward. Northern Georgia contains parts of the Chattahoochee National

Forest, several State parks, and resort communities which are favorite weekend and vacation destinations. Water related recreational activities include swimming, fishing, boating, camping, hiking, photography, etc. Within Metropolitan Atlanta, the Chattahoochee River National Recreation Area of the National Park Service has improved access to the river by providing parks and boat ramps along the river corridor. Tubing, rafting, and fly fishing are popular activities upstream of the confluence of Peachtree Creek and the Chattahoochee River.

Recreational fisheries of the Chattahoochee River Basin consist of a cold-water trout fishery in the mountains above Lake Sidney Lanier and in the river below Buford Dam, where hypolimnetic releases provide cold water necessary for trout habitat. The 49-mile reach of the Chattahoochee River from Buford Dam to Peachtree Creek has been managed by the WRD since 1960 as a trout fishery. Lake Lanier also supports an active warmwater fishery.

Warm-water recreational fisheries exist in the remainder of the Chattahoochee River Basin for various species of bass, catfish, and sunfish. Recreational fishing activities in West Point Lake, Lake Walter F. George, and Lake Seminole support local, economically significant businesses and services, including bait and tackle shops, guide services, tournaments, hotels, and restaurants.

Fish and Wildlife Water Demand

Two Fish and Wildlife facilities utilize surface water in the Chattahoochee Basin (Ziewitz et al., 1996). The WRD operates a trout hatchery (Buford Trout Hatchery) on the banks of the Chattahoochee River about 1.5 miles downstream from Buford Dam. This hatchery uses an average of 7.02 MGD of water from the Chattahoochee River to support operations and rears approximately 150,000 pounds of trout annually, providing about one third of the trout produced by the state for stocking public streams and lakes. Eufaula National Wildlife Refuge pumps water from Lake Walter F. George in the fall to flood several impoundments for waterfowl habitat. The refuge also pumps water in the summer to irrigate crops on the same fields that are flooded in the fall.

Waste Assimilation Water Demand

Water quantity, wastewater treatment, and wastewater discharge permitting are addressed in Section 4. However, it should be noted that the guidelines for discharge of treated effluent into the rivers and streams of the Chattahoochee River Basin assume that sufficient surface water flow will be available to assimilate waste and ensure that water quality criteria will be met. At the present time, two specific instream flow rates have been established as guidelines for waste assimilation purposes: a minimum flow of 750 cfs in the Chattahoochee River at Peachtree Creek and a minimum flow of 1,150 cfs in the Chattahoochee River at Columbia.

Environmental Water Demands

EPD recognizes the importance of maintaining suitable aquatic habitat in Georgia's lakes and streams for support of viable communities of fish and other aquatic organisms. Much of the mainstem of the Chattahoochee River, especially from Lake Lanier south, has been altered drastically by human activities, both physically and with regard to flows. From a water quantity perspective, aquatic habitat is adversely affected by unnatural extreme variations in lake levels and river flow. One significant issue which is receiving increasing attention from EPD is that of the minimum stream flow rate which must be maintained below a reservoir. A current state requirement is to maintain the 7Q10 flow (7-day average low flow with a once in ten years recurrence interval), when water is available upstream. Consideration is being given to an increase in this minimum flow requirement under recommendations of WRD (Evans and England, 1995).

In September of 1996, the Directors of the Environmental Protection Division (EPD) and the Wildlife Resources Divison (WRD) empaneled a multi-disciplinary group of stakeholders to reveiw EPD's current minimum streamflow policy to determine if modifications should be made. EPD's current minimum flow policy is to protect the lowest seven-day average flow which would have occurred during any ten-year period for a stream (commonly called the 7Q10). Over a period of a year, the stakeholder group worked through a number of issues related to the current policy, and determined that it was not in the best interest of instream biological diversity and protection of aquatic habitats to continue with a 7Q10 minimum flow policy. The group also concluded that an insuficient number of instream flow studies had been conducted in Georgia in which to base a long-term modification to the current policy; however there was sufficient relevant national scientific information on which to base several interim modifications to the current policy. Consequently, on November 20, 1997, the stakeholder group submitted a final recommendation paper to Directors of EPD and WRD in which an interim flow policy was described.

This interim policy recommended by the stakeholder group allows future new surface water permit applicants, as well as those current permit holders who seek modifications in their permitted withdrawal quanitities to select one of three methods for determining the streamflow quantities to be protected the withdrawal site. These options are as follows:

A. Monthly 7Q10

For a water supply reservoir, the applicant is at all times required to release the lesser of the monthly 7Q10 or the inflow to the reservoir. For an instream withdrawal, the applicant is at all times required to pass the lesser of the monthly 7Q10 or the inflow to the withdrawal point.

B. Site-Specific Instream Flow Study

The applicant may perform a site-specific instream flow study to determine what minimum flow conditions must be maintained for protection of aquatic habitat. Prior to commencing such an instream flow study, the applicant must receive prior approval of the study design from the Department of Natural Resources. Upon the applicant's completion of the instream flow study, the Department of Natural Resources will evaluate the study results and render a decision regarding the minimum flows which must be preserved by the applicant.

C. Wildlife Resources Division Recommendation

30 Percent Mean Annual Flow (Unregulated)
On unregulated streams (i.e., streams with no stream flow regulation structures), the applicant is at all times required to allow the lesser of 30 percent of the mean annual flow of the stream, or the inflow, to pass the instream withdrawal point.

30/60/40 Percent Mean Annual Flow (Regulated Streams)
On regulated streams, the applicant is at all times required to release from a water supply reservoir, the lesser of 30 percent of the mean annual flow or inflow during the months of July through November; 60 percent of the mean annual flow or inflow during the months of January through April; and 40 percent of the mean annual flow or inflow during the months of May, June, and December.

These options would be available to applicants for new and modified permits until sufficient site-specific information is available in Georgia to develop a permanent modification of the current policy. Current holders of surface water withdrawal permits would be "grandfathered" for the current permit limits.

The Directors of EPD and WRD are currently considering the recommendation, and are expected to make a decision regarding the recommendation in early 1998. At that time an implementation schedule will be determined.

3.2.3 Surface Water Withdrawal Permitting

The 1977 Surface Water Amendments to the Georgia Water Quality Control Act of 1964 require all non-agricultural users of more than 100,000 GPD on a monthly average (from any Georgia surface water body) to obtain a permit for this withdrawal from EPD. These users include municipalities, industries, military installations, and all other non-agricultural users. The statute stipulates that all pre-1977 users who could establish the quantity of their use prior to 1977 would be "grandfathered" for that amount of withdrawal. Table 3-2 lists the permits in effect in the Chattahoochee River Basin.

Applicants are required to submit details relating to the source of withdrawals, demand projections, water conservation measures, low flow protection measures (for non-grandfathered withdrawals), and raw water storage capacities. EPD issued permit identifies the source of withdrawal, the monthly average and maximum 24-hour withdrawal, the standard and special conditions under which the permit is valid, and the expiration date of the permit. The standard conditions section of the permit generally defines the reporting requirements (usually annual submission of monthly average withdrawals); the special conditions section of the permit usually specifies measures the permittee is required to undertake so as to protect downstream users and instream uses (e.g. waste assimilation, aquatic habitat). The objective of these permits is to manage and allocate water resources in a manner that both efficiently and equitably meets the needs of all the users.

The 1988 Amendments to the Water Quality Control Act establish the permitting authority within EPD to issue farm irrigation water use permits. As with the previously mentioned surface water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply for and be granted a permit. With two exceptions, farm use is defined as irrigation of any land used for general farming, aquaculture, pasture, turf production, orchards, nurseries, watering for farm animals and poultry, and related farm activities. One relevant exception is that the processing of perishable agricultural products and the irrigation of recreational turf in the Chattahoochee River watershed upstream from Peachtree Creek are not considered farm uses.

Applicants for these permits who can establish that their use existed prior to July 1, 1988, <u>and</u> when these applications are received prior to July 1, 1991, are "grandfathered" for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

3.2.4 Flooding and Floodplain Management

Sometimes the issue is not the lack of water, but too much water. Floods, as well as droughts, can be very damaging natural hazards. Almost all of Georgia is susceptible to the threat of floods. The Georgia Emergency Management Agency (GEMA) ranks floods as the number one natural hazard in Georgia. Over the past nineteen years, 57 Georgians have lost their lives due to flooding. The Flood of 1994 (Tropical Storm Alberto) is considered the worst flooding event in Georgia since 1841, which is the beginning of the State's recorded flood history. Much of the flooding in 1994 resulted from the overflowing of the Flint River and the Ocmulgee River and, to a much lesser extent, the Chattahoochee River.

In July 1994, rainfall from Tropical Storm Alberto caused severe flooding in the Flint River basin. These floods affected hundreds of thousands of people, damaging or destroying highways, water-supply systems, wastewater treatment plants, crops, and homes. Damage from such a severe flood cannot be averted completely, but with sound hydrologic information, reliable estimates of river stages and of discharges can be made. Using these data, emergency management personnel can provide ample warning of impending danger to communities.

Development within the floodplains of these rivers is also a concern, especially when a community has no means of regulating the development. Development within floodplain areas can increase flood levels, thereby increasing the number of people and the amount of property at risk. Although the term "floodplain management" is often used as a synonym for program or agency-specific projects and regulations, it is in fact quite a broad concept. It is a continuous process of making decisions about whether floodplains are to be used for development and how they are to be developed. It encompasses the choices made by owners of floodplain homes and businesses, developers, and officials at all levels of government.

3.3 Ground Water Quantity

3.3.1 Ground Water Sources

As part of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa (ACF/ACT) Comprehensive Basin Study, scientists at USGS completed studies of ground water resources in each of eight geographic subareas of the ACF/ACT basins. The Chattahoochee River Basin is coincident with sub-areas 1 through 3 of this study, and a portion of sub-area 4.

Ground water Subarea 1 constitutes the upper Chattahoochee River Basin above Whitesburg, Georgia, and contains parts of the Blue Ridge and Piedmont physiographic provinces (Chapman and Peck, 1995a). These provinces are underlain by crystalline-rock aquifers (metamorphic and igneous rocks) having little or no primary porosity. The yield of bedrock wells depends on the characteristics of the water-bearing zones penetrated by the open borehole. Well yields greater than 100 gal/min (0.144 MGD) are considered to be high-yielding. Yields of 200 to 300 gal/min (0.288 to 0.432 MGD) are not uncommon when wells are properly sited. USGS analyzed ground water contributions to flow in the Chattahoochee River using hydrograph separation. For the Chattahoochee flow measured at Whitesburg above West Point Lake, the mean annual transfer of ground water to surface water discharge is estimated to be 2,720 cubic feet per second.

Chapman and Peck (1995a) conclude that ground water resources are underutilized within Subarea 1. Most communities, particularly in the metropolitan Atlanta area, rely solely on surface water resources for water supply. Ground water could serve as a supplemental resource during many peak demand periods and under drought conditions.

Subarea 2 includes the part of the Chattahoochee River Basin between Whitesburg and Columbus, and is within the Piedmont physiographic province (Chapman and Peck, 1995b). Ground water resource conditions are thus similar to those in Subarea 1, and, like Subarea 1, ground water resources in Subarea 2 are thought to be underutilized. Ground water also contributes to surface flow within Subarea 2. The estimated mean annual ground-water discharge contribution to the Chattahoochee River at Columbus, Georgia is estimated to be about 4,620 cubic feet per second, of which 504 cubic feet per second is derived from Alabama.

Subarea 3 includes the part of the Chattahoochee River Basin between Columbus and Early Co., and is within the Southeastern Coastal Plain physiographic province (Southern Coastal Plain and Georgia Sand Hills land-resource areas) (Mayer, 1995). The aquifer system in Subarea 3 is comprised of sedimentary rock sequences that dip and thicken to the south. The outcrop area of the sedimentary rocks functions as the recharge area of the aquifers, receiving precipitation that infiltrates down to the saturated zone. Most of the water that enters the aquifers as recharge is eventually discharged to nearby streams or rivers. Under average conditions, 1,619 cfs is discharged from the ground water flow system to the Chattahoochee River, of which 63 percent originates in Georgia and 37 percent in Alabama. In contrast, during the severe drought of 1986, 341 cfs was discharged to the Chattahoochee River, of which 85 percent originated in Georgia. Total 1990 ground water withdrawals in the Chattahoochee River Basin portion of Subarea 3 equaled about 1 ½ percent of the mean annual ground-water discharge, and about 6 percent of the 1986 drought discharge (Mayer, 1995). Of this withdrawal, about 25 percent occurs in Georgia and 75 percent in Alabama.

Subarea 4 includes a portion of the southern Chattahoochee River Basin (Torak and McDowell, 1994), and is also within the Southern Coastal Plain province. This area is underlain by Coastal Plain sediments consisting of alternative units of sand, clay, sandstone, dolomite and limestone that gradually thicken and dip gently to the southeast. The primary water-bearing system is the Upper Floridan aquifer. This aquifer has a high capacity to store and transmit water, attributable to the fractured nature of the constituent Ocala limestone and associated dissolution of limestone by ground water

3.3.2 Ground Water Supply Demands

Municipal and Industrial Uses

Ninety-nine percent of the Chattahoochee basin M&I water demand in 2005 is projected to be supplied by surface water withdrawals (458 MGD). The ground water withdrawals are projected to be only 4 MGD in the Chattahoochee basin. Ground water pumpage is expected to intercept some water that would have surfaced in the streams, and this amount can be viewed as ground water demand that is effectively supplied by surface water. This effect depends on the geology of the basin. In the Chattahoochee River Basin outside of sub-area 4, the ground water demand can also be viewed as an equivalent amount of surface water demand.

Agricultural Water Demand

Total agricultural water demand for the Chattahoochee River Basin is discussed above in Section 3.2.2, and is derived from surface and ground water sources. In the Piedmont Chattahoochee sub-basin most agricultural water is for livestock and aquaculture, and is supplied from surface water. In the Coastal Chattahoochee sub-basin most agricultural water is for crops and orchards, and ground water supplies 44 percent of this water demand.

3.3.3 Ground Water Supply Permitting

The Georgia Ground Water Use Act of 1972 requires permits from EPD for all non-agricultural users of ground water of more than 100,000 GPD. General information required of the applicant includes location (latitude and longitude), past, present, and expected water demand, expected unreasonable adverse effects on other users, the aquifer system from which the water is to be withdrawn, and well construction data. The permits issued by EPD stipulate both the allowable monthly average and annual average withdrawal rates, standard and special conditions under which the permit is valid, and the expiration date of the permit. Ground water use reports are generally required of the applicant on a semi-annual basis. The objective here is the same as with surface water permits. A list of active Georgia municipal and industrial ground water withdrawal permits is provided in Table 3-4.

The 1988 Amendments to the Ground Water Use Act establishes the permitting authority within EPD to issue farm irrigation water use permits. As with the previously mentioned ground water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply and be granted a permit. With two exceptions, farm use is defined as irrigation of any land used for general farming, aquaculture, pasture, turf production, orchards, nurseries, watering for farm animals and poultry, and related farm activities. One exception relevant to the Chattahoochee River Basin is that the processing of perishable agricultural products and the irrigation of recreational turf in the Chattahoochee River watershed upstream from Peachtree Creek are not considered farm uses. Agricultural withdrawal permits are too numerous to list in this document.

Applicants for these permits who can establish that their use existed prior to July 1, 1988, and when their applications are received prior to July 1, 1991, are “grandfathered” for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

Table 3-4. Active Municipal and Industrial Ground Water Withdrawal Permits in the Chattahoochee River Basin

County	Permit #	Type	Permit User	Monthly Permitted Flow (MGD)	Yearly Permitted Flow (MGD)	Aquifer
Chattahoochee	026-0002	Municipal	Chattahoochee Co. Water System	0.330	0.330	Cretaceous Sand
Chattahoochee	026-0001	Municipal	City of Cusseta	0.310	0.260	Cretaceous Sand
Clay	030-0001	Municipal	City of Fort Gaines	0.310	0.220	Providence Sand
Cobb	033-0002	Municipal	Cobb-Marietta Water Authority	0.150	0.020	Crystalline Rock
Cobb	033-0001	Municipal	Cobb-Marietta Water Authority	0.900	0.150	Crystalline Rock
Early	049-0003	Municipal	City of Blakely	2.700	2.700	Clayton, Claiborne, Cretaceous Sand
Early	049-0004	Industrial	Georgia Tubing Co.	0.504	0.504	Claiborne, Tallahatta, Wilcox
Early	049-0001	Industrial	Great Southern Paper Co.	0.200	0.125	Tallahatta, Wilcox, Clayton
Forsyth	058-0001	Industrial	Laurel Springs Farm Golf Course	0.400	0.160	Crystalline Rock
Fulton	060-0004	Industrial	Digital Equipment Corp.	0.150	0.150	Crystalline Rock
Fulton	060-0005	Industrial	Ford Motor Co. - Atlanta	0.291	0.291	Crystalline Rock
Fulton	060-0002	Industrial	Nabisco Brands, Inc.	0.100	0.100	Crystalline Rock
Habersham	068-0001	Municipal	Town of Alto	0.700	0.500	Crystalline Rock
Hall	069-0004	Industrial	Con Agra Broiler Co.	0.300	0.300	Crystalline Rock
Hall	069-0002	Industrial	Fieldale Farms Corp.	1.200	1.200	Crystalline Rock
Harris	072-0002	Municipal	City of Hamilton	0.115	0.115	Crystalline Rock
Harris	072-0001	Industrial	Ida Cason Calloway Foundation	0.500	0.400	Crystalline Rock

Table 3-4. (Continued)

County	Permit #	Type	Permit User	Monthly Permitted Flow (MGD)	Yearly Permitted Flow (MGD)	Aquifer
Heard	074-0001	Municipal	City of Franklin	0.250	0.200	Crystalline Rock
Lumpkin	093-0001	Municipal	City of Dahlonega	0.231	0.231	Crystalline Rock
Stewart	128-0002	Municipal	City of Lumpkiin	0.250	0.250	Cretaceous Sand
Troup	141-0001	Industrial	Dominion Engineered Textiles	0.100	0.100	Crystalline Rock
White	154-0002	Municipal	City of Cleveland	0.225	0.225	Crystalline Rock
White	154-0001	Municipal	City of Helen	0.290	0.290	Crystalline Rock

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Section 4

Environmental Stressors

This section describes the significant environmental stressors which impair or threaten water quality in the Chattahoochee River Basin. These include both traditional chemical stressors (such as metals or oxygen demanding waste) and less traditional stressors, such as modification of the flow regime (hydromodification) and alteration of physical habitat. Section 4.1 discusses environmental stressors by source type. Section 4.2 then provides a summary of stressor loads by type of stressor.

4.1 Sources and Types of Stressors

Environmental stressors are first catalogued by type of source in this section. This is the traditional programmatic approach, and provides a match to regulatory lines of authority for permitting and management. Assessment requires an integration of stressor loads across all sources, as described in Section 4.2.

4.1.1 Point Sources

Point sources constitute permitted discharges of treated wastewater to the river and its tributaries, regulated under the National Pollutant Discharge Elimination System (NPDES). These are divided into two main types: permitted wastewater discharges, which tend to discharge at relatively stable rates, and permitted stormwater discharges, which tend to discharge at highly irregular, intermittent rates, depending on precipitation. Non-discharging (land application) waste disposal facilities, which prevent discharge of wastewater effluent to surface waters, are also discussed in this section.

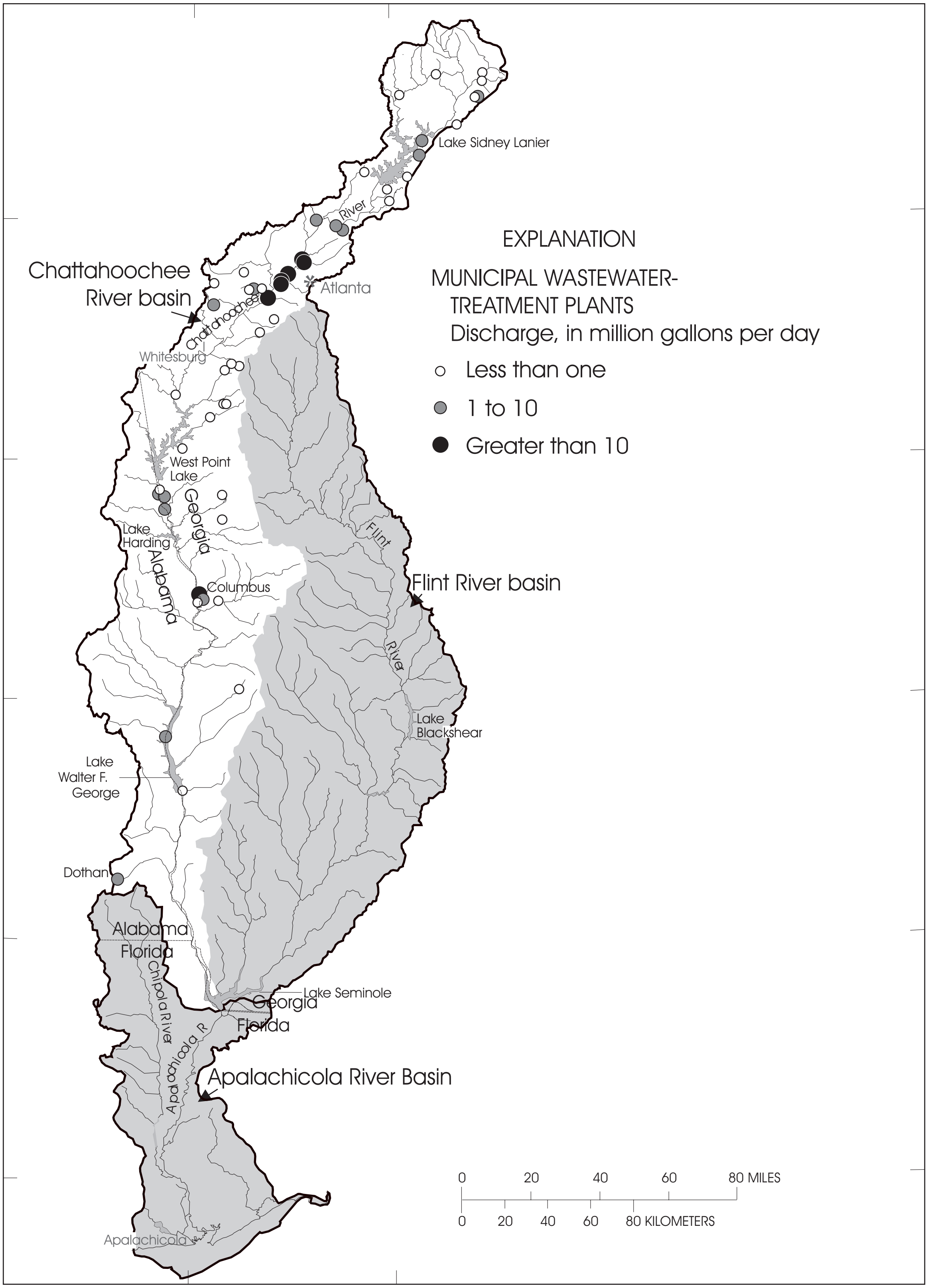
4.1.1.1 NPDES Permitted Wastewater Discharges

Table 4-1 displays the major municipal wastewater treatment plants with permitted discharges of 1 million gallons per day (MGD) or greater in the Chattahoochee River Basin, including wastewater dischargers in the Alabama portion of the basin. (Florida reports no NPDES permits for discharges to surface water within the Chattahoochee River Basin.) The geographic distribution of dischargers is shown in Figure 4-1. In addition, there are discharges from a variety of smaller wastewater treatment plants, including both public facilities (small public water pollution control plants, schools, marinas, etc.) and private facilities (package plants associated with non-sewered developments and mobile home parks) with less than 1 MGD flow. These minor discharges may have the potential to cause localized stream impacts, but are relatively insignificant from a basin perspective.

Approximately 326 MGD of treated wastewater is currently discharged from water pollution control plants in Georgia into the Chattahoochee River or tributaries by permitted point source discharges, including municipal and industrial sources. Alabama contributes another 16.5 MGD of treated wastewater. About 74% of the Georgia discharges occur in the metropolitan Atlanta area (to the lower portion of HUC 03130001 and upper portion of HUC 03130002). While the river provides a means to assimilate these treated wastewaters, the discharges are sources of a variety of environmental stressors which must be regulated and controlled to prevent degradation of the receiving water.

Table 4-1. Major Municipal Wastewater Treatment Plant Discharges with Permitted Monthly Average Flow Greater than 1 MGD in the Chattahoochee River Basin

NPDES Permit #	Facility Name	Authority	County	State	Receiving Stream	Permitted Monthly Average Flow (MGD)
HUC 03130001						
GA0046019	Cumming WPCP	Cumming	Forsyth	Georgia	Big Crk	2.000
GA0024333	Fulton Co. - Big Creek WPCP	Fulton Co.	Fulton	Georgia	Chattahoochee River	24.00
GA0030686	Fulton Co. -Johns Creek WPCP	Fulton Co.	Fulton	Georgia	Chattahoochee River	7.000
GA0023167	Buford Southside WPCP	Buford	Gwinnett	Georgia	Suwanee Cr	2.000
GA0026433	Gwinnett Co (Crooked Crk WPCP)	Gwinnett Co.	Gwinnett	Georgia	Chattahoochee River	36.00
GA0021504	Cornelia WPCP	Cornelia	Habersham	Georgia	So Fork-Little Mud Cr	3.000
GA0020168	Gainesville (WPCP No 2)	Gainesville	Hall	Georgia	Lake Lanier	3.000
GA0021156	Gainesville Flat Cr WPCP	Gainesville	Hall	Georgia	Flat Crk/Lake Lanier	7.000
HUC 03130002						
AL0024724	East Alabama WWTP	East Alabama	Chambers	Alabama	Chattahoochee River	4.000
AL0023159	Lanett WWTP	Lanett	Chambers	Alabama	Chattahoochee River	5.000
GA0026140	Cobb Co-Sutton WPCP	Cobb Co.	Cobb	Georgia	Chattahoochee River	40.00
GA0026158	Cobb Co.-So. Cobb WPCP	Cobb Co.	Cobb	Georgia	Chattahoochee River	28.00
GA0031721	Newnan Wahoo WPCP	Newnan	Coweta	Georgia	Unnamed Tributary to Wahoo Creek	2.300
GA0030341	Douglasville South WPCP	Douglasville	Douglas	Georgia	Anneewakee Crk Trib\Chattahoochee	3.250
GA0047201	Douglasville (Sweetwater)	Douglasville	Douglas	Georgia	Chattahoochee River	3.000
GA0021458	Atlanta- Utoy Creek WPCP	Atlanta	Fulton	Georgia	Chattahoochee River	40.00
GA0021482	Atlanta (R.M. Clayton WPCP)	Atlanta	Fulton	Georgia	Chattahoochee River	100.0
GA0024040	Atlanta (South River WPCP)	Atlanta	Fulton	Georgia	Chattahoochee River via Atlanta Utoy Creek	48.00
GA0025381	Fulton Co-Camp Creek WPCP	Atlanta	Fulton	Georgia	Chattahoochee River	13.00
GA0020052	West Point WPCP	West Point	Troup	Georgia	Chattahoochee River	1.000
GA0036951	LaGrange WPCP (Long Cane Crk)	Lagrange	Troup	Georgia	Chattahoochee River	12.5
HUC 03130003						
AL0061671	Eufaula WWTP	Eufaula	Barbour	Alabama	Chattahoochee River	2.700
AL0022209	Phenix City WWTP	Phenix City	Russell	Alabama	Chattahoochee River	7.750
GA0020516	Columbus - South WPCP	Columbus Water Works	Muscogee	Georgia	Chattahoochee River	40.00
HUC 03130004						
AL0022764	Dothan Omusee Creek WWTP	Dothan	Houston	Alabama	Omusee Creek	5.000



Base modified from U.S. Geological Survey digital files

Figure 4-1. Location of Municipal Wastewater Treatment Plants in the Chattahoochee River Basin

EPD NPDES permit program provides a basis for regulating municipal and industrial waste discharges, monitoring compliance with limitations, and appropriate enforcement action for violations. For point source discharges, the permit establishes specific effluent limitations and specifies compliance schedules that must be met by the discharger. Effluent limitations are designed to achieve water quality standards in the receiving water, and are re-evaluated periodically (at least every 5 years).

Municipal wastewater treatment plants are among the most significant point sources regulated under the NPDES program in the Chattahoochee River Basin, accounting for greater than 96% of the total point source effluent flow (exclusive of cooling water). These plants collect, treat, and release large volumes of treated wastewater. Pollutants associated with treated wastewater include pathogens, nutrients, oxygen demanding waste, metals, and chlorine residuals. Over the past several decades, Georgia has invested over $500,000,000 in construction and upgrade of municipal water pollution control plants in the Chattahoochee River Basin, as summarized in Appendix C. These upgrades have resulted in significant reductions in pollutant loading and consequent improvements in water quality below wastewater treatment plant outfalls. The most widely used measure of municipal pollution is the extent to which the organic content of treated wastewater depletes oxygen in the receiving water and reduces the oxygen available to fish and aquatic life. In 1994, it was estimated that approximately 93% of oxygen demanding wastes produced by municipalities was removed by municipal water pollution control plants. As of the 1994-95 water quality assessment, only 6 segments (60 miles) of river/streams were identified in which municipal discharges contributed to not fully supporting designated uses, all of which are being addressed through the NPDES permitting process. A current issue for Atlanta and Columbus is combined sewer overflows (CSOs) which have historically discharged diluted, untreated municipal wastewater during wet weather. Georgia is currently in the process of bringing all CSOs into compliance with federal and State water quality standards, as described in Section 4.1.1.2.

Most urban wastewater treatment plants also receive industrial process and non-process wastewater, which may contain a variety of conventional and toxic pollutants. Control of industrial pollutants in municipal wastewater is addressed through pretreatment programs. The major publicly-owned wastewater treatment plants in this basin have developed and implemented approved local industrial pretreatment programs. Through these programs, the wastewater treatment plants are required to establish effluent limitations for their significant industrial dischargers (those that discharge in excess of 25,000 gallons per day of process wastewater or are regulated by a Federal Categorical Standard) and to monitor the industrial user's compliance with those limits. The treatment plants are able to control the discharge of organics and metals into their sewerage system through the controls placed on their industrial users.

Industrial and federal wastewater discharges are also significant point sources regulated under the NPDES program. There are a total of 179 permitted municipal, state, federal, private, and industrial wastewater and process water discharges in the Chattahoochee River Basin, as summarized in Table 4-2. The complete permit list is summarized in Appendix D.

Only a small number of the industrial dischargers discharge significant amounts of flow. Since the nature of industrial discharges varies widely compared to discharges from municipal plants, effluent flow is not generally a good measure of the significance of an industrial discharge. Industrial discharges can consist of organic heavy oxygen-demanding waste loads

Table 4-2. Summary of NPDES Permits in the Chattahoochee River Basin

HUC	Major Municipal Facilities		Major Industrial and Federal Facilities		Small Public and Private and Minor Industrial Facilities		Total
	Georgia	Alabama	Georgia	Alabama	Georgia	Alabama	
03130001	8	-	1	-	60	-	69
03130002	11	2	3	0	58	4	78
03130003	1	2	1	1	7	12	24
03130004	0	1	1	1	2	3	8

from facilities such as pulp and paper mills, large quantities of non-contact cooling water and very little else from facilities such as power plants, pit pumpout and surface runoff from mining and quarrying operations where the principal source of pollutants is the land disturbing activity rather than the addition of any chemicals or organic materials, or complex mixtures of organic and inorganic pollutants from chemical manufacturing, textile processing, metal finishing, etc. Pathogens and chlorine residuals are rarely of concern with industrial discharges, but other conventional and toxic pollutants must be addressed on a case-by-case basis through the NPDES permitting process. As of the 1994-95 water quality assessment, six (6) segments (47 miles) of river/streams in the Georgia portion of the basin were identified in which industrial discharges contributed to not supporting designated uses, all of which are being addressed through the NPDES permitting process. Table 4-3 lists the eight major industrial and federal wastewater treatment plants with discharges into the Chattahoochee River Basin in Georgia and Alabama. There are also 59 minor industrial discharges which may have the potential to cause localized stream impacts, but are relatively insignificant from a basin perspective.

The locations of permitted point source discharges of treated wastewater in the Chattahoochee River Basin are shown in Figures 4-2 through 4-5 .

4.1.1.2 Combined Sewer Overflows

Combined sewers are sewers that carry both storm water runoff and sanitary sewage in the same pipe. Most of these combined sewers were built at the turn of the century and were found in most large cities. At that time both sewage and storm water runoff were piped from the buildings and streets to the small streams that originated in the heart of the city. When these streams were enclosed in pipes, they became today's combined sewer systems. As the cities grew, their combined sewer system expanded. Often new combined sewers were laid in order to move the untreated wastewater discharge to the outskirts of the town or to the nearest waterbody.

In later years wastewater treatment facilities were built and smaller sanitary sewers were constructed to carry the sewage (dry weather flows) from the termination of the combined sewers to these facilities for treatment. However during wet weather when significant stormwater is carried in the combined system, the sanitary sewer capacity is exceeded and a combined sewer overflow (CSO) occurs. The surface discharge is a mixture of stormwater and

Table 4-3. Major Industrial and Federal Wastewater Treatment Facilities in the Chattahoochee River Basin

NPDES Permit #	Facility Name	Description	County	Receiving Stream
HUC 03130001				
GA0001112	Scovill Fasteners	Manufacturing - Fasteners	Habersham (Georgia)	Soque River
HUC 03130002				
GA0000922	Franklin Aluminum Co.	Manufacturing - Nonferrous Metals	Heard (Georgia)	Hillabahatchee Creek
GA0001473	GA. Power - Plant Yates	Electric Power	Coweta (Georgia)	Chattahoochee River
GA0001198	USAF Lockheed - Martin Plant #6	National Security	Cobb (Georgia)	Nickajack Creek, Rottenwood Creek, Poorhouse Creek
HUC 03130003				
AL0000817	Mead Coated Board	Manufacturing - Paperboard	Russell (Alabama)	Chattahoochee River
GA0000973	U.S. Army - Fort Benning	National Security	Chattahoochee (Georgia)	Chattahoochee River
HUC 03130004				
AL0024619	SNC Farley Nuclear Plant	Electric Power	Houston (Alabama)	Chattahoochee River
GA0001201	Ga. Pacific Corp.	Paper	Early (Georgia)	Chattahoochee River

sanitary waste. Uncontrolled CSOs thus discharge raw diluted sewage, and can introduce elevated concentrations of bacteria, BOD, and solids into a receiving water body. In some cases, CSOs discharge into relatively small creeks.

CSOs are considered a point source of pollution and are subject to the requirements of the Clean Water Act. Although CSOs are not required to meet secondary treatment effluent limits, sufficient controls are required to protect water quality standards for the designated use of the receiving stream. In the 1990 session of the Georgia Legislature, a CSO law was passed requiring all Georgia cities to eliminate or treat CSOs. There are two cities in the Chattahoochee River Basin that have combined sewer systems, Atlanta and Columbus.

Although CSO controls are well underway in the Chattahoochee Basin, there are very limited data on the overall effectiveness of the controls and resulting improvement to water quality. The next Basin Planning cycle should provide more information on the effects of CSO mitigation on water quality in the Chattahoochee Basin.

Atlanta CSOs

The City of Atlanta began studying their CSOs in the early 1970's and some crude screening and grit removal facilities were installed. Following the 1990 legislative action, the City developed a control plan that involved two different types of control methods: direct treatment

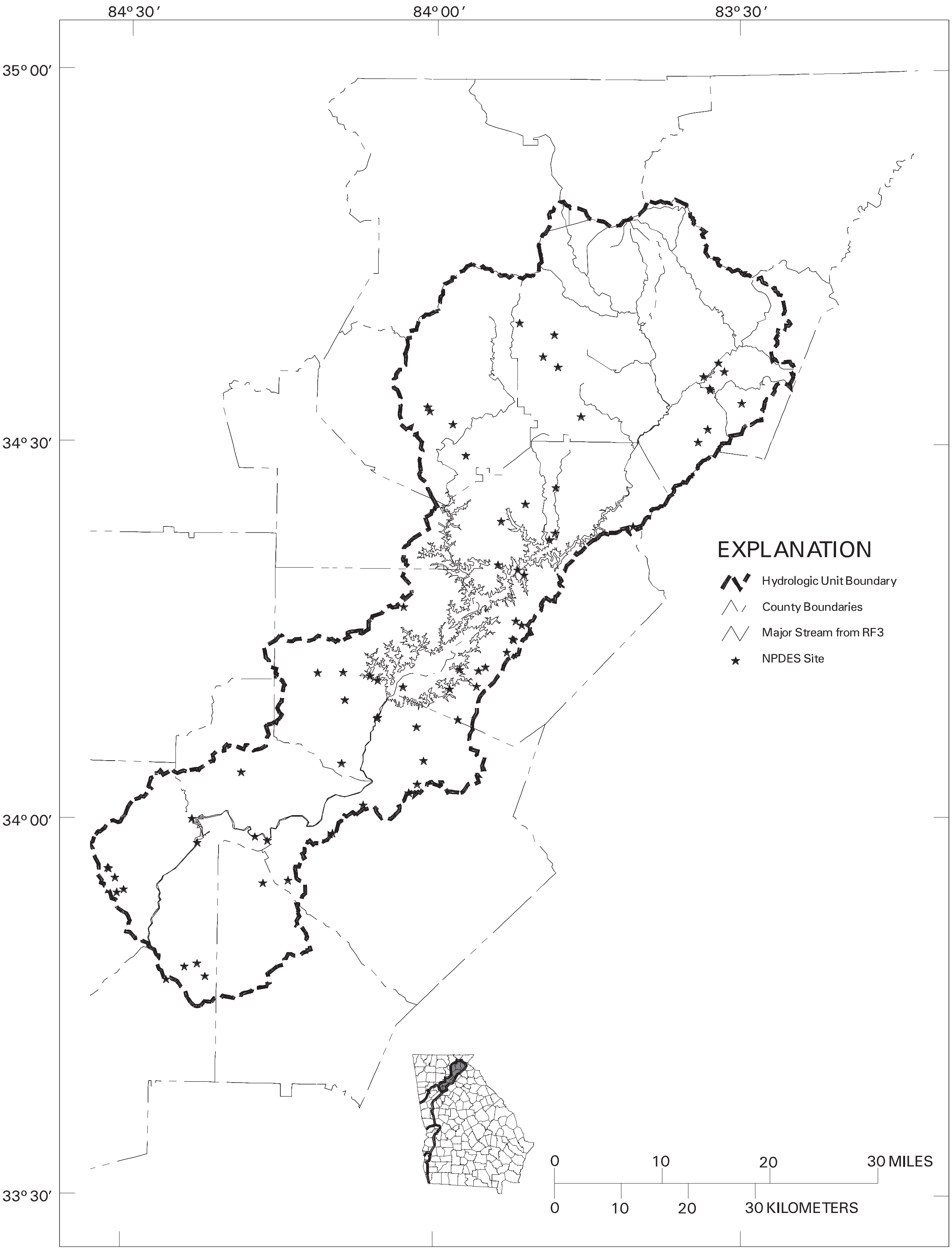


Figure 4-2. NPDES Sites Permitted by GAEPD, Upper Chattahoochee River Basin, HUC 03130001

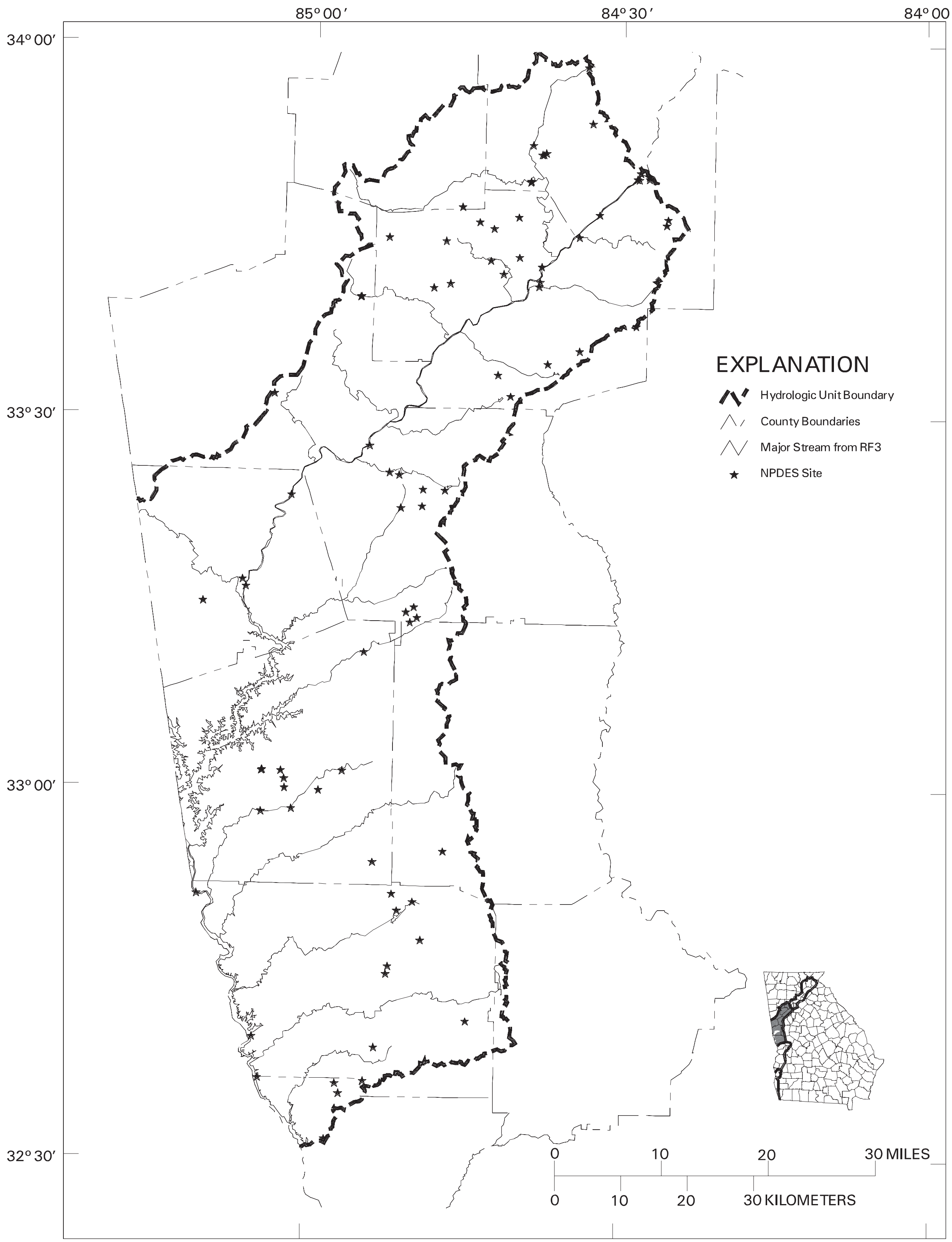


Figure 4-3. NPDES Sites Permitted by GAEPD, Middle Chattahoochee River Basin, HUC 03130002

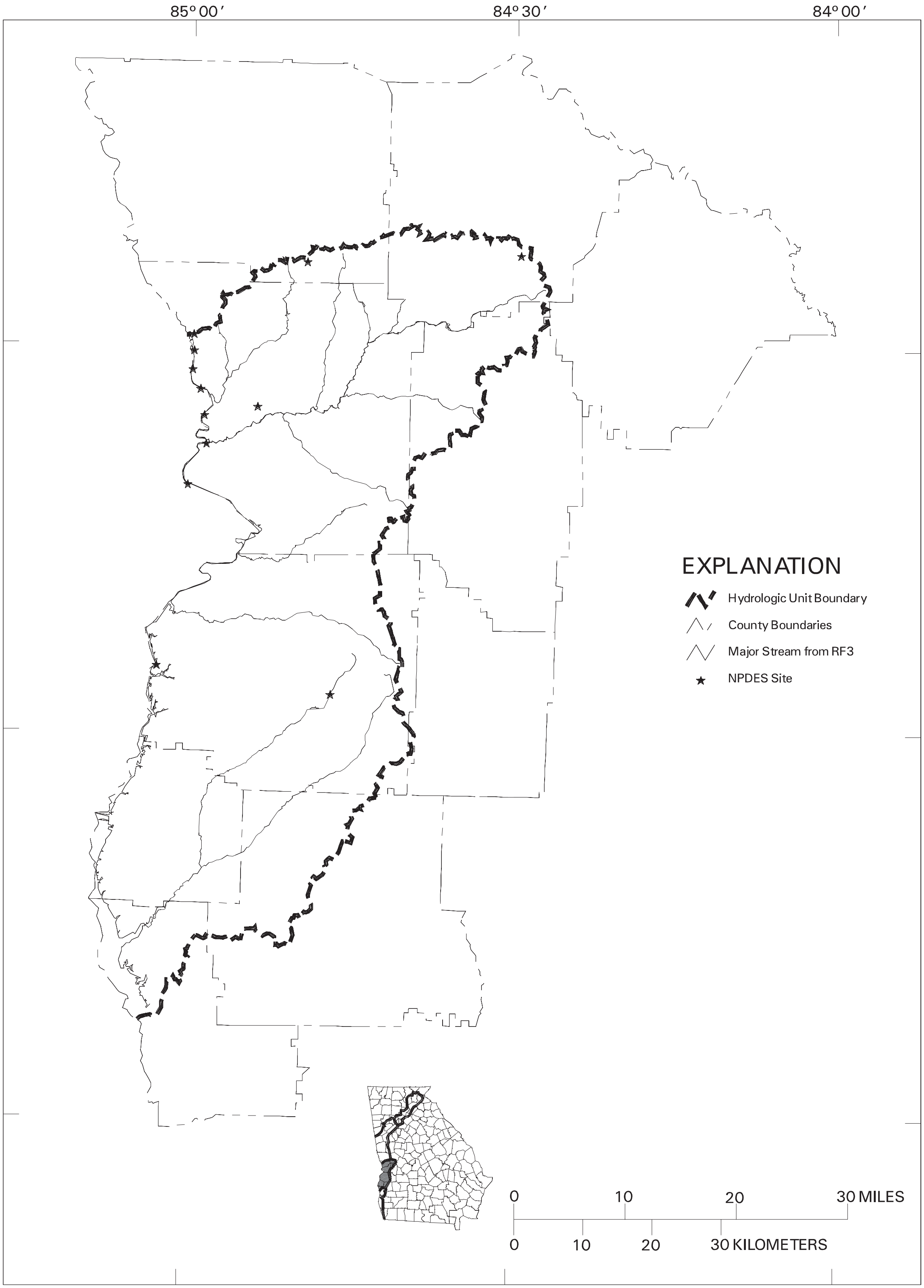


Figure 4-4. NPDES Sites Permitted by GAEPD, Middle Chattahoochee River Basin, HUC 03130003

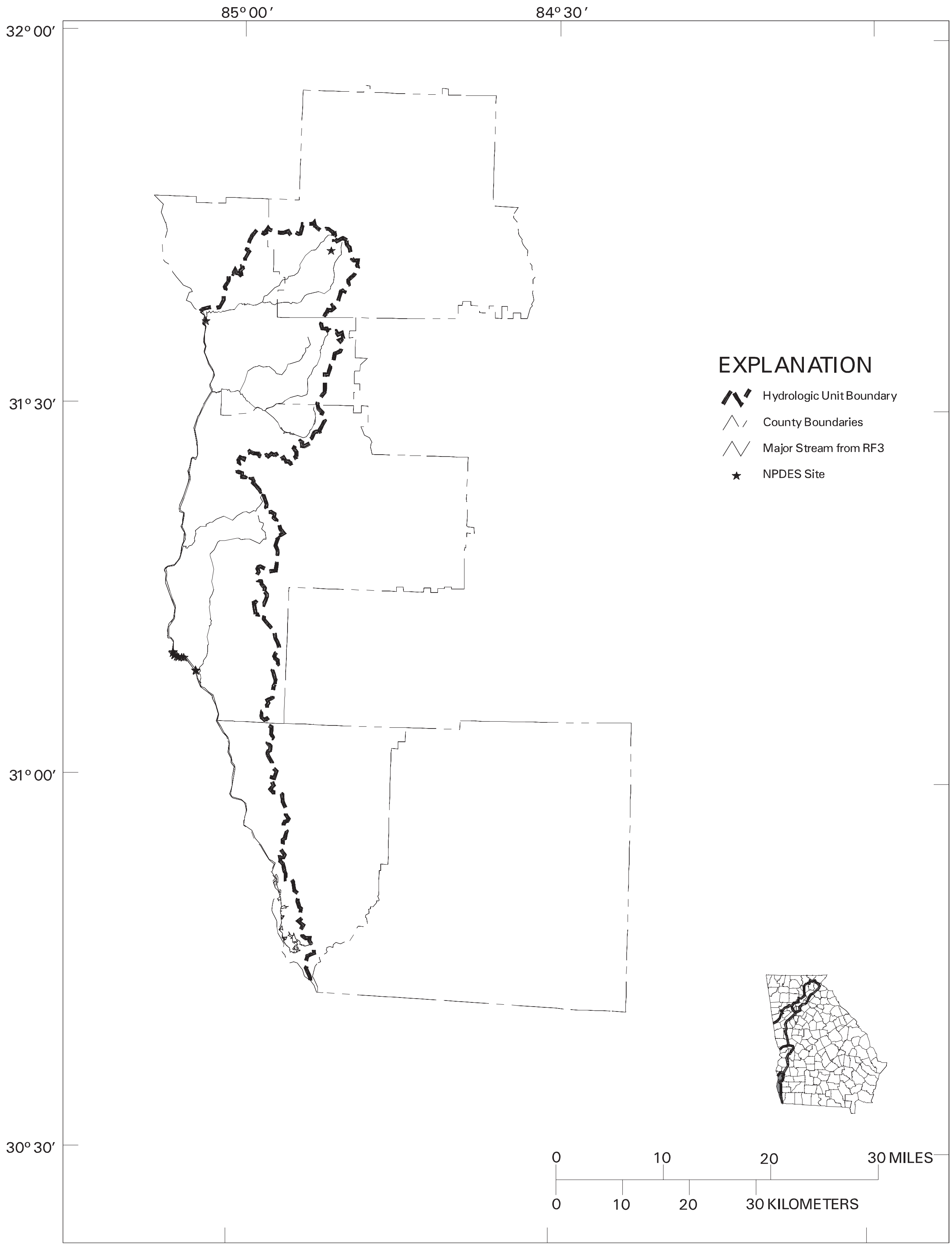


Figure 4-5. NPDES Sites Permitted by GAEPD, Lower Chattahoochee River Basin, HUC 03130004

with screening/disinfection and sewer separation. There are six CSOs in Atlanta that discharge or formerly discharged to the Chattahoochee basin (Table 4-4).

The Tanyard Creek, North Avenue and Greensferry facilities, consisting of coarse and fine screens and disinfection, became operational in 1994. These treatment facilities were designed to remove debris by screening. In addition, all of the overflow is chlorinated to kill bacteria. The total cost of CSO controls on these three facilities was approximately $40 million. These controls significantly reduce the impact of CSO events on the Chattahoochee.

The Clear Creek CSO treatment facility (HUC 03130001), with screening and disinfection similar to the three that are in operation, was constructed in Piedmont Park to treat combined sewer overflows from that area. The work was complete in late 1997. Projected total cost for the Clear Creek project is approximately $80 million.

There is one major CSO in the Basin that does not yet have controls in operation and continues to discharge untreated waste during wet weather:

- The City is utilizing sewer separation in the Utoy Creek basin (HUC 03130002). Construction on the sewer separation project began in early 1996. The project is expected to be completed by the end of 1998. Utoy Creek sewer separation construction cost will not be known until the design work is finalized. Current estimated cost is around $50 million.

Columbus CSOs

The City of Columbus owns and operates a wastewater collection system and treatment facility for the City and Muscogee County. Approximately 10% of the sewer system service area contains combined sewers (about 2600 acres). An additional 2600 acres of separate sanitary sewers discharge into the combined sewer systems. There were 16 CSO discharge points prior to control; 15 flowing directly to the Chattahoochee River and one to Weracoba Creek, a tributary (all within HUC 03130003). Approximately 18% of the annual CSO volume is intercepted and transported to the South Columbus Wastewater Treatment facility.

Table 4-4. Status of Atlanta Combined Sewer Overflows

CSO NAME	CONTROL METHOD	STATUS	NPDES Permit
HUC 03130001			
Tanyard Creek	Screening and Disinfection	In Operation	GA0037109
Clear Creek	Screening and Disinfection	Under Construction	GA0036871
Glidden (Woodall Creek)	Sewer Separation	Eliminated	No longer discharges
HUC 03130002			
Utoy Creek (West End Park, Cascade Road)	Sewer Separation	Under Construction	GA0037095
North Avenue (Proctor Creek)	Screening and Disinfection	In Operation	GA0037117
Greensferry (Proctor Creek)	Screening and Disinfection	In Operation	GA0037125

Following the action by the Georgia Legislature in 1990, Columbus initiated studies to examine the pollution impact of its CSOs. Collection systems were modeled and a variety of alternative controls were evaluated. Direct treatment of the CSO was determined to be the most cost-effective control technology.

At present, Columbus CSOs include two treatment systems, Northern and Southern. Both include a combination of sewer separation, flow diversion and control, gravity and force main transport and direct treatment at the only two remaining overflow locations, 19th Street and State Docks. These two treatment facilities consist of vortex separators for solids removal followed by chemical disinfection. The total cost of the Columbus CSO project was approximately $80 million and the project was operational by December, 1995. Combination of treatment and solids removal should substantially reduce loads of pollutants derived from the system.

4.1.1.3 NPDES Permitted Stormwater Discharges

Urban stormwater runoff has been identified as a major source of stressors such as oxygen demanding waste (BOD) and fecal coliform bacteria in the Chattahoochee basin. Stormwater may flow directly to streams as a diffuse, nonpoint process, or may be collected and discharged through a storm sewer system. Storm sewers are now subject to NPDES permitting and are discussed in this section. Nonpoint stormwater is discussed in Section 4.1.2.2.

Pollutants typically found in urban storm water runoff include pathogens (such as bacteria and viruses from human and animal waste), heavy metals, debris, oil and grease, petroleum hydrocarbons and a variety of compounds toxic to aquatic life. In addition, the runoff often contains sediment, excess organic material, fertilizers (particularly nitrogen and phosphorus compounds), herbicides, and pesticides which can upset the natural balance of aquatic life in lakes and streams. Storm water runoff may also increase the temperature of a receiving stream during warm weather, which is particularly threatening to the valuable trout fishery in the Chattahoochee River Basin. All of these pollutants, and many others, influence the quality of storm water runoff. There are also many potential problems related to the quantity of urban runoff, which can contribute to flooding and erosion in the immediate drainage area and downstream.

In accordance with Federal "Phase I" storm water regulations, the State of Georgia has issued individual area-wide NPDES municipal separate storm sewer system (MS4) permits to 58 cities and counties in municipal areas with populations greater than 100,000 persons. Permits in the Chattahoochee basin are shown in Table 4-5.

Industrial sites often have their own stormwater conveyance systems. Volume and quality of storm water discharges associated with industrial activity is dependent upon a number of different factors, such as the industrial activities occurring at the facility, the nature of precipitation, and the degree of surface imperviousness. These discharges are of intermittent duration with short-term pollutant loadings that can be high enough to have shock loading effects on the receiving waters. The types of pollutants from industrial facilities are generally similar to those found in storm water discharges from commercial and residential sites; however, industrial facilities have a significant potential for discharging at higher pollutant concentrations, and may include specific types of pollutants associated with a given industrial activity.

Table 4-5. Permitted Municipal Separate Storm Sewer Systems, Chattahoochee River Basin

Permit #	Permittee	Contact	Address	City	ZIP	County	Type	Issued	Expires	HUC
GAS000105	Chamblee	Mr. Johnson W. Brown, Mayor	5468 Peachtree Road	Chamblee	30341	DeKalb	Large/DeKalb Coapp	06/15/94	06/14/99	03130001
GAS000113	Doraville	Gene Lively, Mayor	3725 Park Avenue	Doraville	30340	DeKalb	Large/DeKalb Coapp	06/15/94	06/14/99	03130001
GAS000131	Roswell	Scott Forward, Eng. Division	38 Hill Street, Suite C-50	Roswell	30075	Fulton	Large/Independent	06/15/94	06/14/99	03130001
GAS000102	Alpharetta	Mr. Jarvis Middleton, P.W. Dept.	82 Haynes Bridge Road	Alpharetta	30201	Fulton	Large/Independent	06/15/94	06/14/99	03130001
GAS000135	Sugar Hill	Gary Wilson, Mayor	4988 West Broad Street	Sugar Hill	30518	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000144	Suwanee	Richard A. Trice, Mayor	Post Office Box 58	Suwannee	30174	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000127	Norcross	Lillian Webb, Mayor	65 Lawrenceville Street	Norcross	30071	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000112	Duluth	Shirley Lassiter, Mayor	3578 West Lawrenceville Street	Duluth	30136	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000138	Berkeley Lake	Mr. Richard Schmidt, Mayor	4040 Berkeley Lake Road	Berkeley Lake	30136	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000104	Buford	Mr. Mitch Peavey, City Mgr	95 Scott Street	Buford	30518	Gwinnett	Large/Gwinnett Coapp	06/15/94	06/14/99	03130001
GAS000108	Cobb County	Henry Mingledorff, C.C.Water Sys.	680 South Cobb Drive, Bldg 3	Marietta	30060	Cobb	Large/Independent	06/15/94	06/14/99	001&002
GAS000125	Marietta	Russell Moorehead, PW Dept	205 Lawrence Street	Marietta	30060	Cobb	Large/Independent	06/15/94	06/14/99	001&002
GAS000132	Smyrna	Ken Hildebrandt, PW Dept.	Post Office Box 1226	Smyrna	30081	Cobb	Large/Independent	06/15/94	06/14/99	001&002
GAS000117	Fulton County	Earl Burrell, PW Dept	141 Pryor Street, SW, Suite 6001	Atlanta	30303	Fulton	Large/Independent	06/15/94	06/14/99	001&002
GAS000100	Atlanta	Mr. Richard Chime, P.W. Dept.	55 Trinity Avenue, Suite 4700	Atlanta	30335	Fulton	Large/Independent	06/15/94	06/14/99	001&002
GAS000103	Austell	Mr. Clay Hays,P.W. Director	2716 Broad Street	Austell	30001	Cobb	Large/Independent	06/15/94	06/15/99	03130002
GAS000129	Powder Springs	Bobby Elliot, PW Dept	Post Office Box 46	Powder Springs	30073	Cobb	Large/Independent	06/15/94	06/14/99	03130002
GAS000128	Palmetto	William Gaddy, PW Dept.	Post Office Box 190	Palmetto	30268	Fulton	Large/Independent	06/15/94	06/14/99	03130002
GAS000115	Fairburn	Tony Cox, City Admin.	Post Office Box 145	Fairburn	30213	Fulton	Large/Independent	06/15/94	06/14/99	03130002
GAS000114	East Point	Derek Bogan, PW Dept	2777 East Point Street	East Point	30344	Fulton	Large/Independent	06/15/94	06/14/99	03130002
GAS000109	College Park	Brad Russell, WQ Coord.	1886 West Harvard Avenue	College Park	30337	Fulton	Large/Independent	06/15/94	06/14/99	03130002
GAS000136	Union City	Sonya Carter, City Admin.	5047 Union Street	Union City	30291	Fulton	Large/Independent	06/15/94	06/14/99	03130002
GAS000202	Columbus Consolidated Govt.	Ron Smith, Eng.	Post Office Box 1340	Columbus	31993	Muscogee	Medium/Independent	04/20/95	04/19/00	03130003

EPD has issued one general permit regulating storm water discharges for 10 of 11 Federally regulated industrial subcategories. The eleventh subcategory, construction activities, will be covered under a separate general permit. The general permit for industrial activities requires the submission a Notice of Intent (NOI) for coverage under the general permit, the preparation and implementation of a storm water pollution prevention plan, and in some cases, the monitoring of storm water discharges from the facility. As with the municipal storm water permits, implementation of site-specific best management practices is the preferred method for controlling storm water runoff. As of December 31, 1995 approximately 2600 "Notice of Intent" applications for these general permits have been submitted to EPD. It is estimated that greater than 10,000 facilities may ultimately be impacted by the stormwater regulations.

4.1.1.4 Non-discharging Waste Disposal Facilities

Land Application Systems (LAS)

In addition to permits for point source discharges, EPD has developed and implemented a permit system for land application systems. Land application systems for final disposal of treated wastewaters have been encouraged in Georgia, and are designed to eliminate surface discharges of effluent to waterbodies. Land application systems are used as alternatives to advanced levels of treatment or as the only alternative in some environmentally sensitive areas.

When properly operated, a LAS should not be a source of stressors to surface waters. Their locations are, however, worth noting because of the (small) possibility that a LAS could malfunction and become a source of stressor loading.

A total of 128 municipal and 35 industrial permits for land application systems were in effect in Georgia in 1995. Municipal and other major wastewater land application systems (permitted flow greater than 0.01 MGD) within the Chattahoochee Basin are listed in Table 4-6. The locations of all LAS's within the basin are shown in Figures 4-6 through 4-9.

Landfills

Permitted landfills are required to contain and treat any leachate or contaminated run-off prior to discharge to any surface water. The permitting process encourages either direct connection to a publicly-owned treatment works (although vehicular transportation is allowed in certain cases) or treatment and recirculation on-site to achieve a no-discharge system. Direct discharge in compliance with NPDES requirements is allowed but not currently practiced at any landfills in Georgia. Groundwater contaminated by landfill leachate from older, unlined landfills represents a potential threat to waters of the State. Groundwater and surface water monitoring and corrective action requirements are in place for all landfills operated after 1988 to identify and remediate potential threats. Provisions of the Hazardous Sites Response Act address threats posed by older landfills as releases of hazardous constituents are identified. All new municipal solid waste landfills are required to be lined and have a leachate collection system installed.

EPD's Land Protection Branch is responsible for permitting and compliance of municipal and industrial Subtitle D landfills. The location of permitted landfills within the basin is shown in Figures 4-10 through 4-13.

Table 4-6. Wastewater Land Application Systems in the Chattahoochee Basin

Operator	Location	Permit No.	Permitted Flow (MGD)
Municipal/Privately Owned Treatment Systems			
Alexander High School	Douglas Co.	GA03-757	0.038
Chattahoochee Co.	Chattahoochee Co.	GA02-224	0.022
Days Inn LaGrange	LaGrange	GA02-276	0.137
Dorsett Shoals Elementary School	Douglas Co.	GA03-826	0.011
Helen LAS	Helen	GA02-157	0.500
Inner Harbor Hospital	Paulding Co.	GA02-104	0.020
Sugar Hills LAS	Gwinnett Co.	GA02-0003	0.500
Unicoi	White Co.	GA02-066	0.075
U.S. Army Camp Merrill	Lumpkin Co.	GA03-727	0.350
Whitesburg LAS	Carroll Co.	GA02-118	0.080
Industrial and Agricultural Systems			
Crystal Farms	Hall Co.	GA01-527	0.015
Dutch Quality House	Hall Co.	GA01-432	0.040
Georgia Proteins, Inc.	Forsyth Co.	GA01-572	0.500
Glidden Company	Hall Co.	GA01-362	0.020
LJS Grease & Tallow	Carroll Co.	GA01-591	0.020
J.R. Wrigley Company	Hall Co.	GA01-595	0.050

4.1.2 Nonpoint Sources

The pollution impact on Georgia's streams has radically shifted over the last two decades. Streams are no longer dominated by untreated or partially treated sewage discharges which resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have recovered, and healthy fisheries have followed. Industrial discharges have also been placed under strict regulation. However, other sources of pollution are still affecting Georgia's streams. These sources are referred to as *nonpoint*, and consist of mud, litter, bacteria, pesticides, fertilizers, metals, oils, grease, and a variety of other pollutants which are washed from rural and urban lands by stormwater.

Nonpoint pollutant loading comprises a wide variety of sources not subject to point source control via NPDES permits. The most significant nonpoint sources are those associated with precipitation, washoff, and erosion, which may move pollutants from the land surface to water bodies. Both rural and urban land uses can contribute significant amounts of nonpoint pollution. A review of 1994-95 water quality assessment results for the Chattahoochee indicates that urban runoff and rural nonpoint sources contribute significantly to nonsupport of water uses.

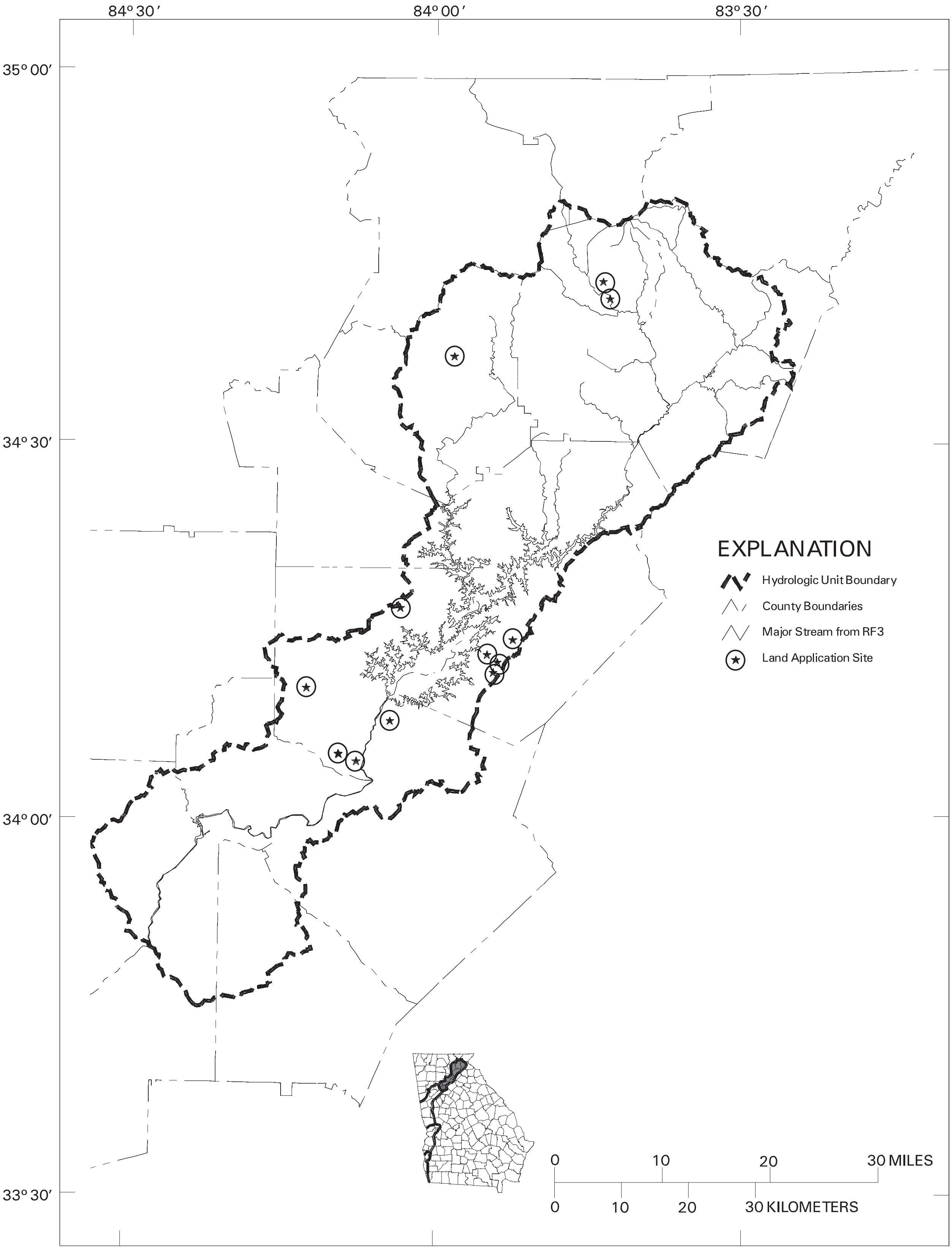


Figure 4-6. Land Application Systems, Upper Chattahoochee River Basin, HUC 03130001

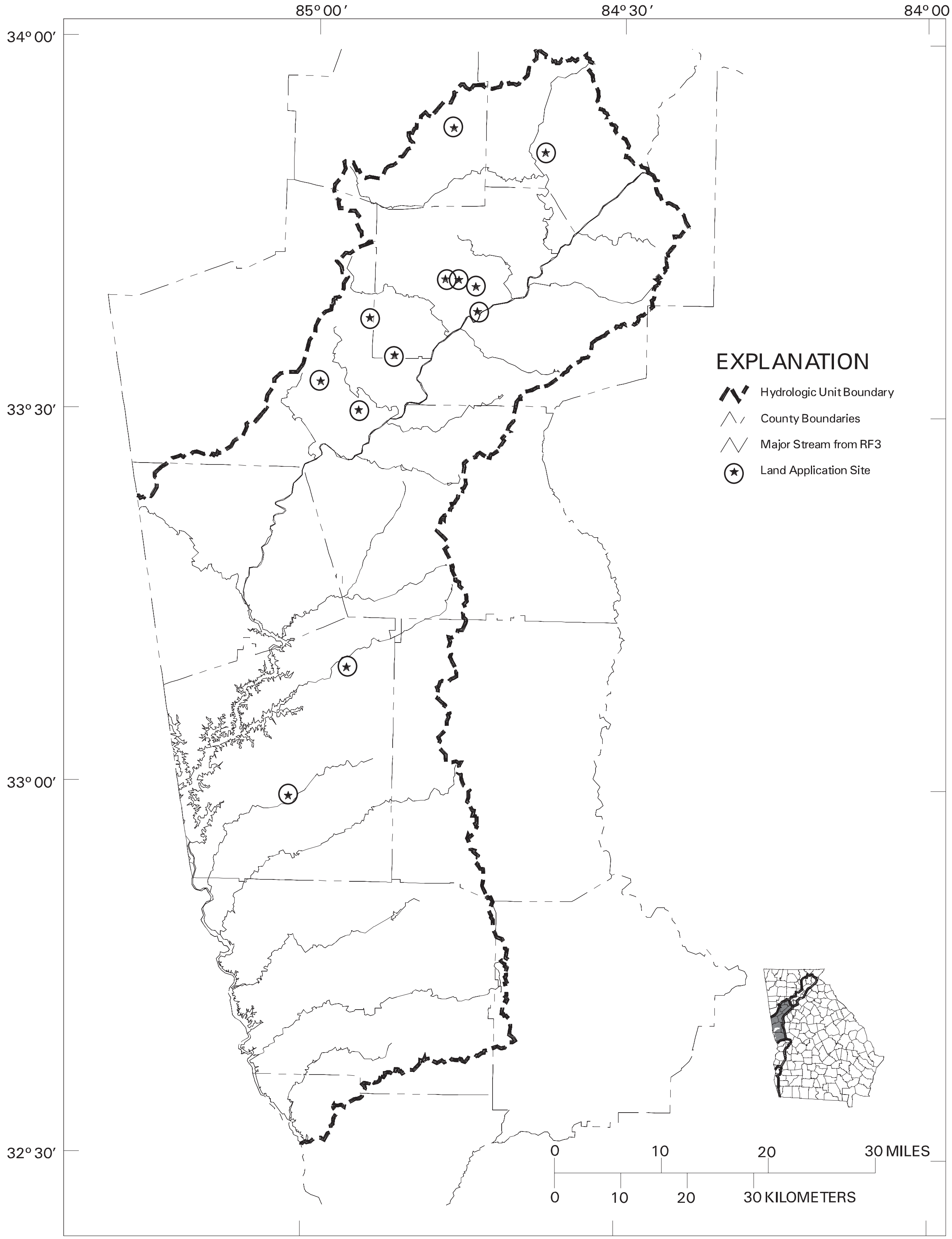


Figure 4-7. Land Application Systems, Middle Chattahoochee River Basin, HUC 03130002

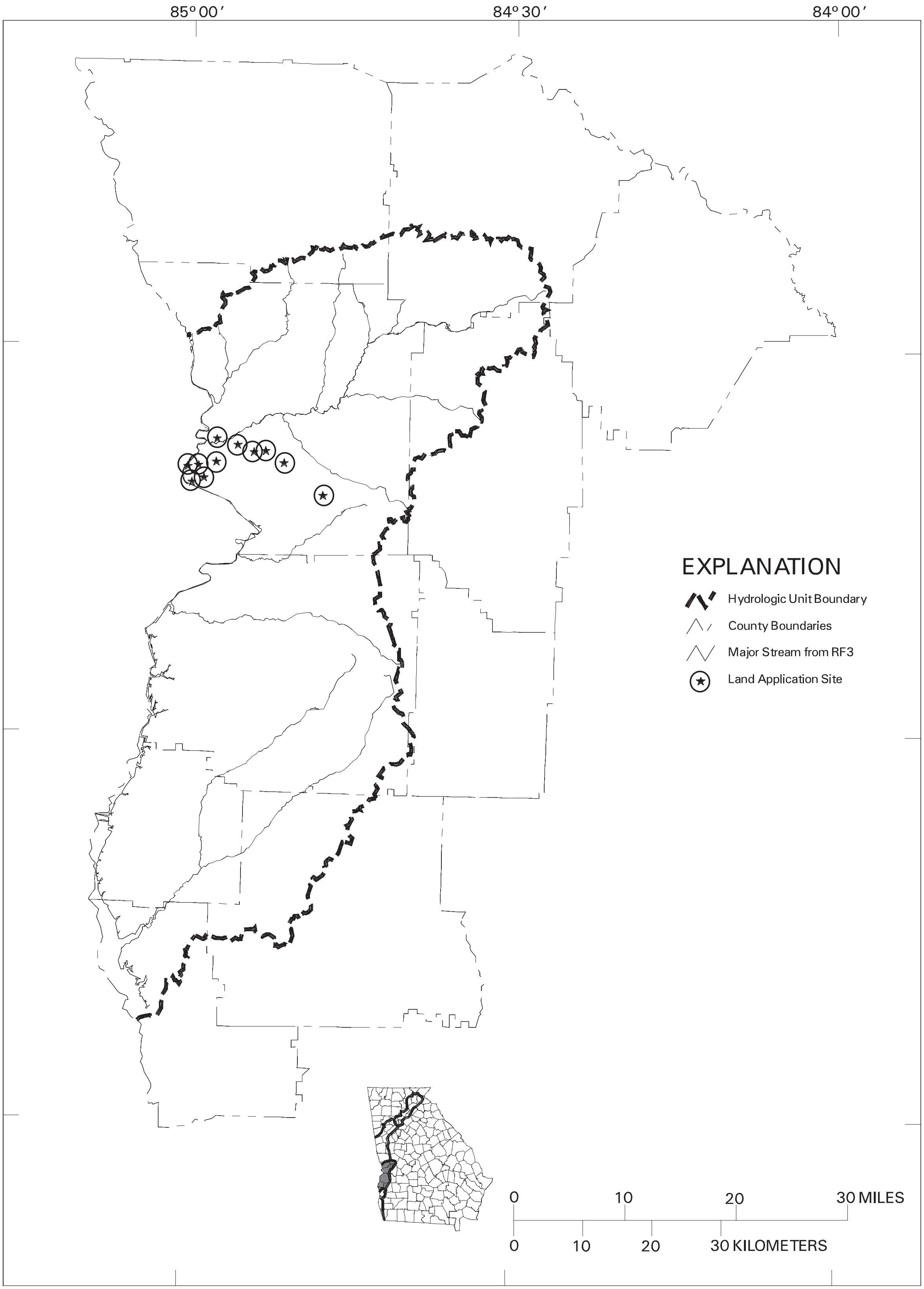


Figure 4-8. Land Application Systems, Middle Chattahoochee River Basin, HUC 03130003

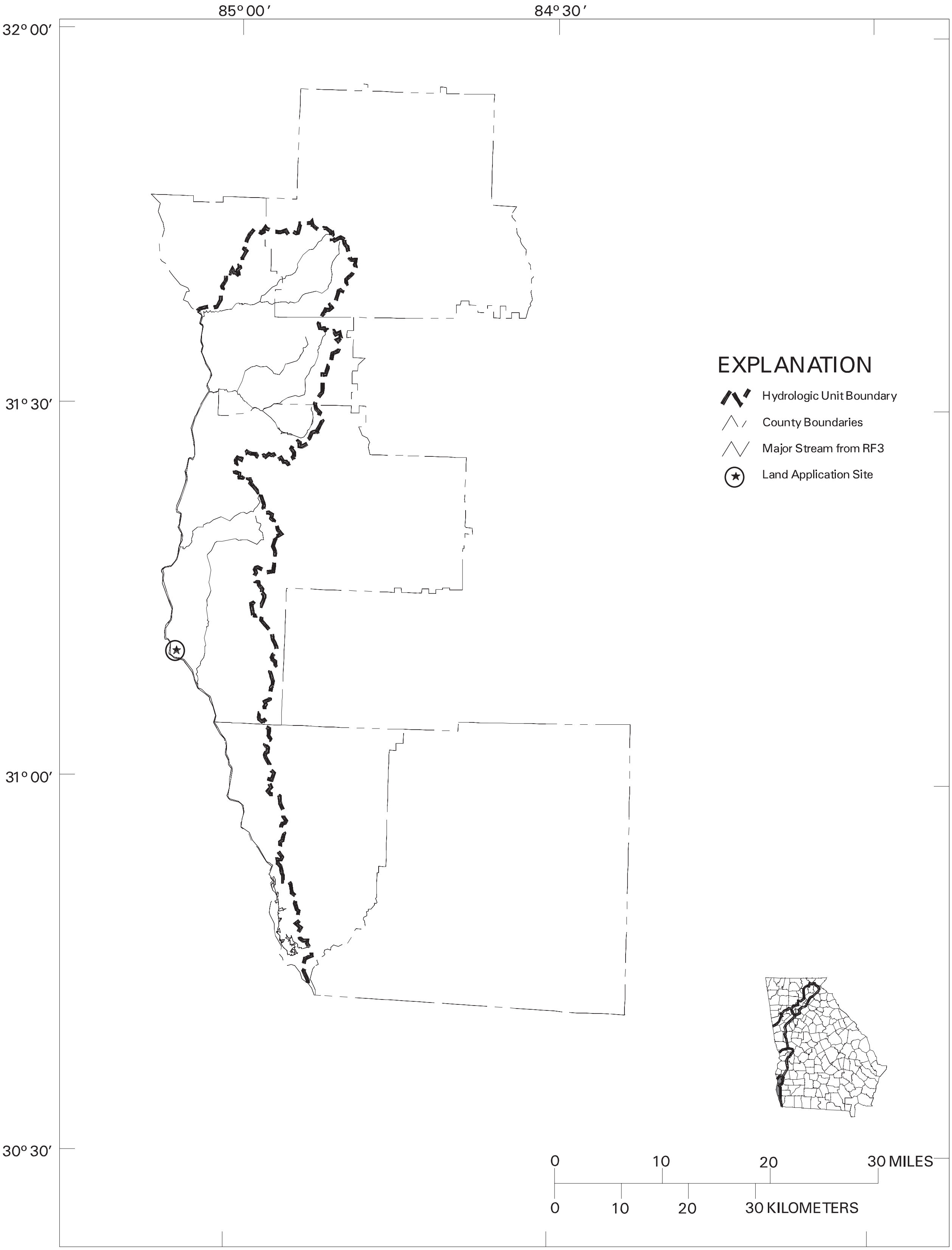


Figure 4-9. Land Application Sites, Lower Chattahoochee River Basin, HUC 03130004

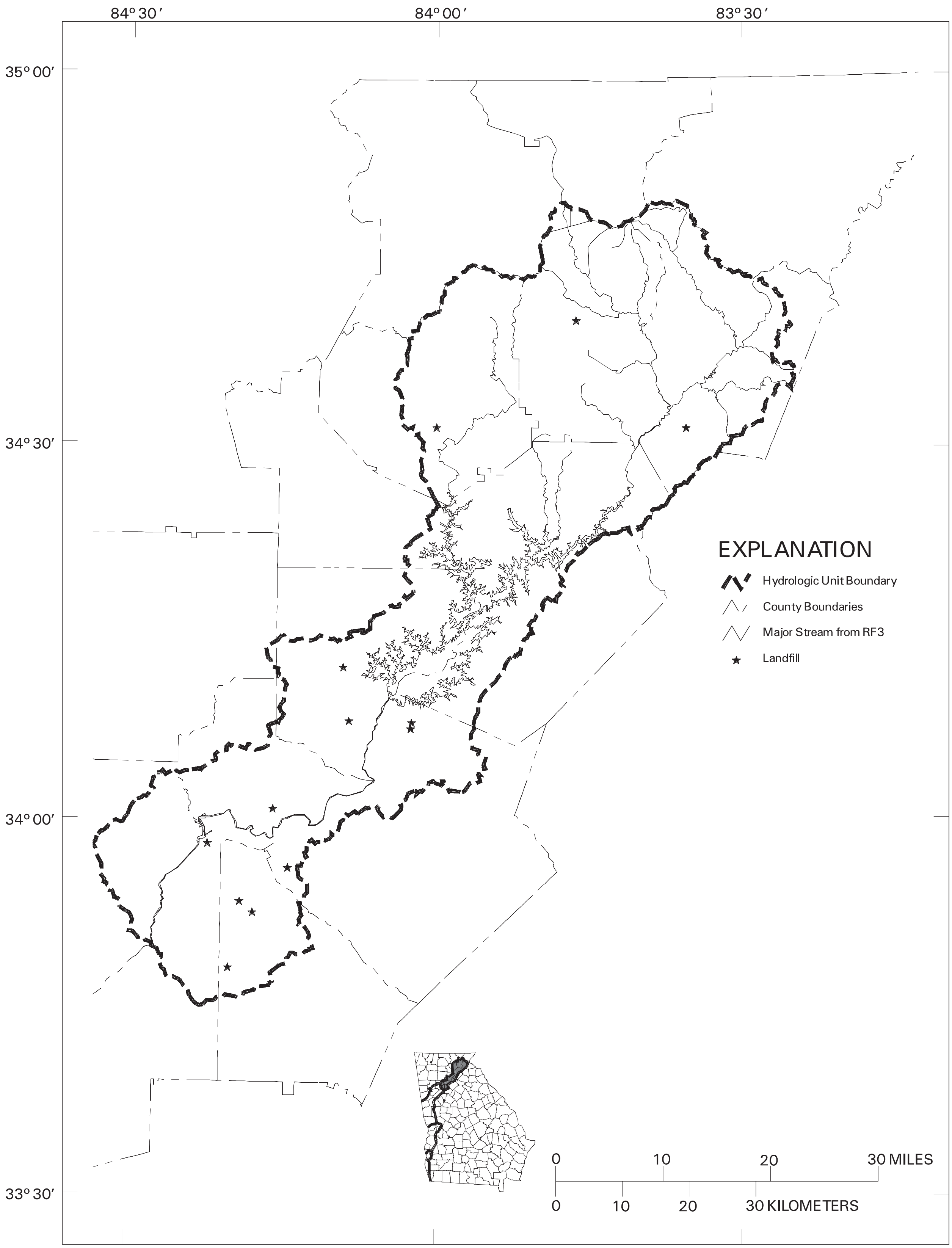


Figure 4-10. Landfills, Upper Chattahoochee River Basin, HUC 03130001

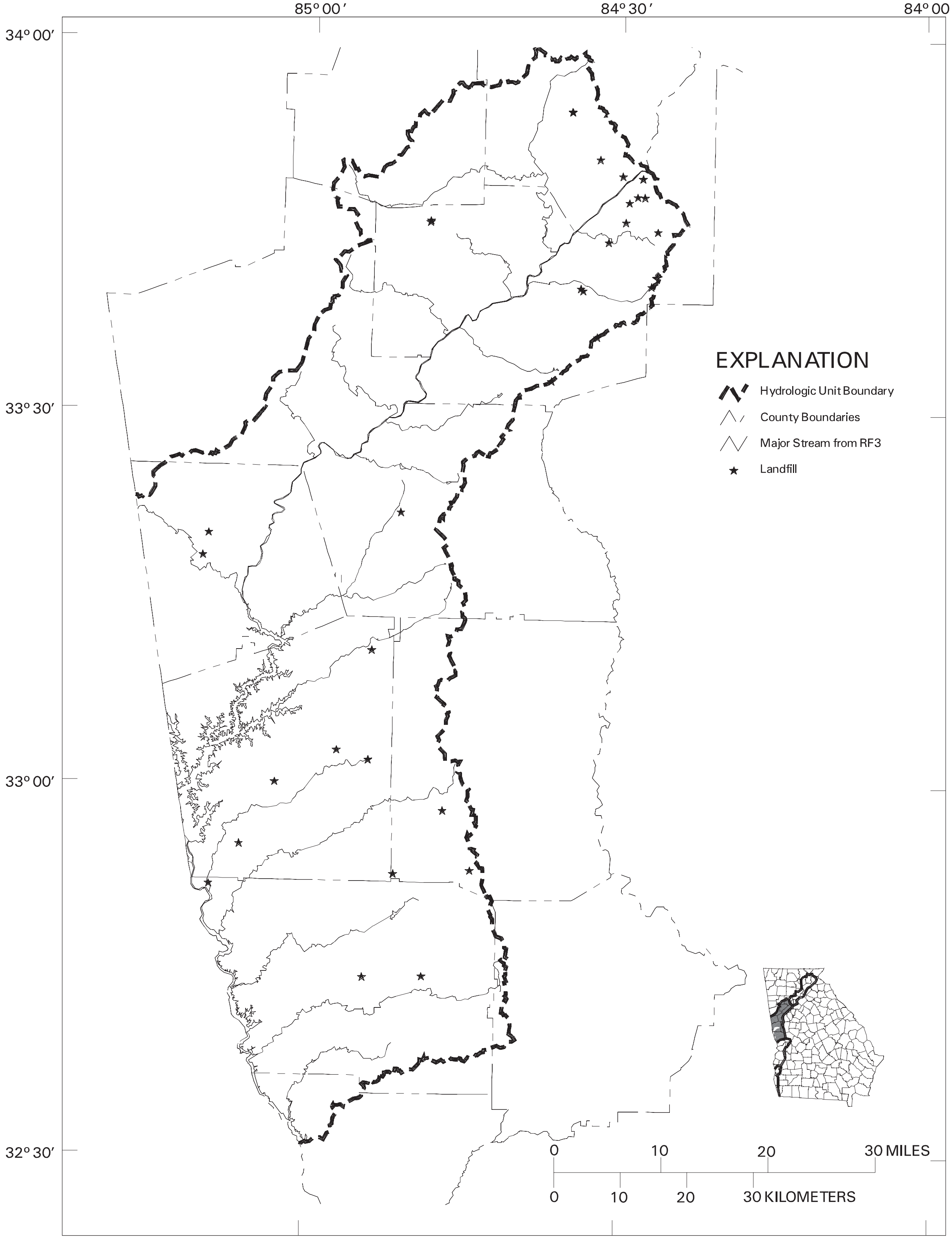


Figure 4-11. Landfills, Middle Chattahoochee River Basin, HUC 03130002

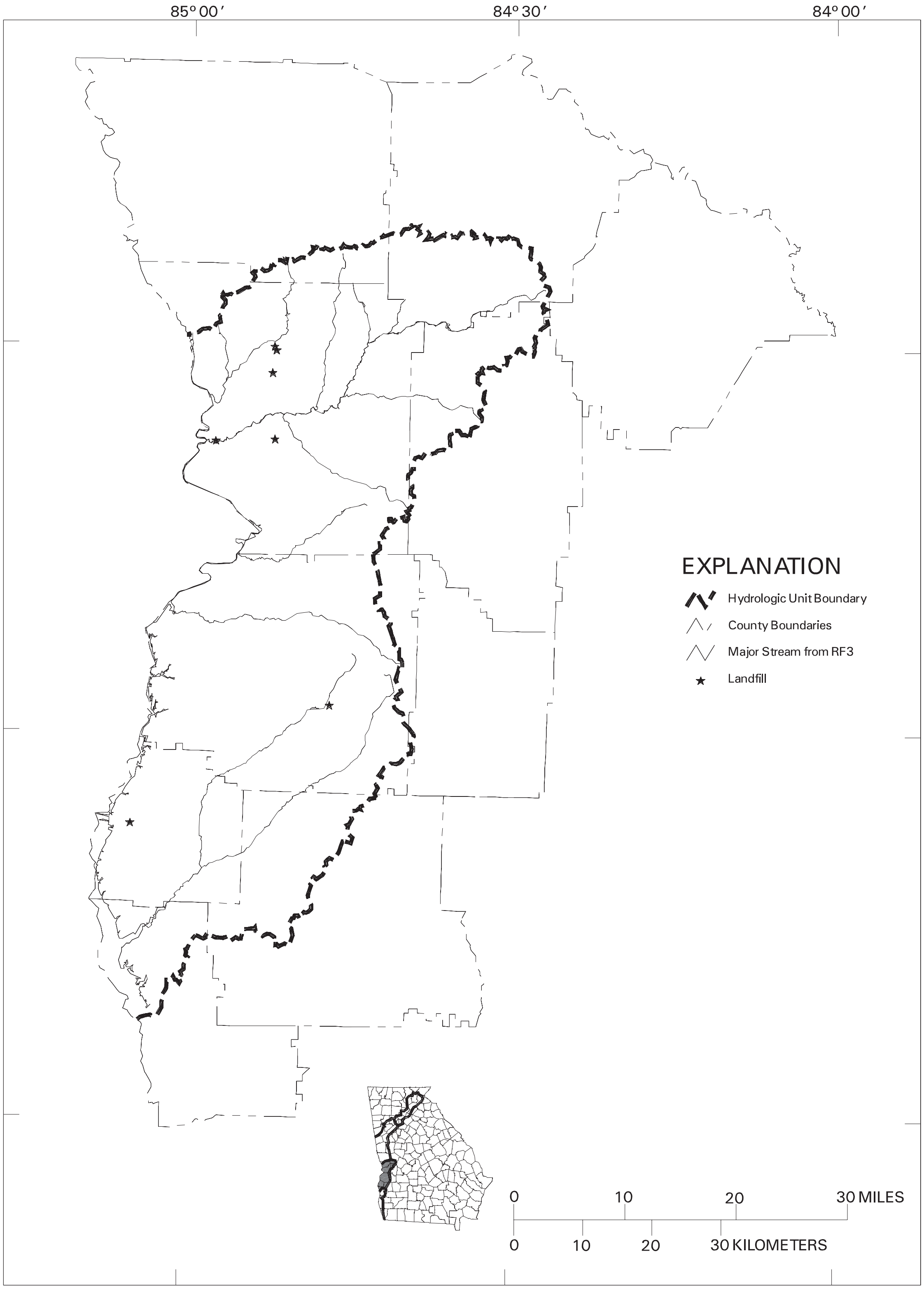


Figure 4-12. Landfills, Middle Chattahoochee River Basin, HUC 03130003

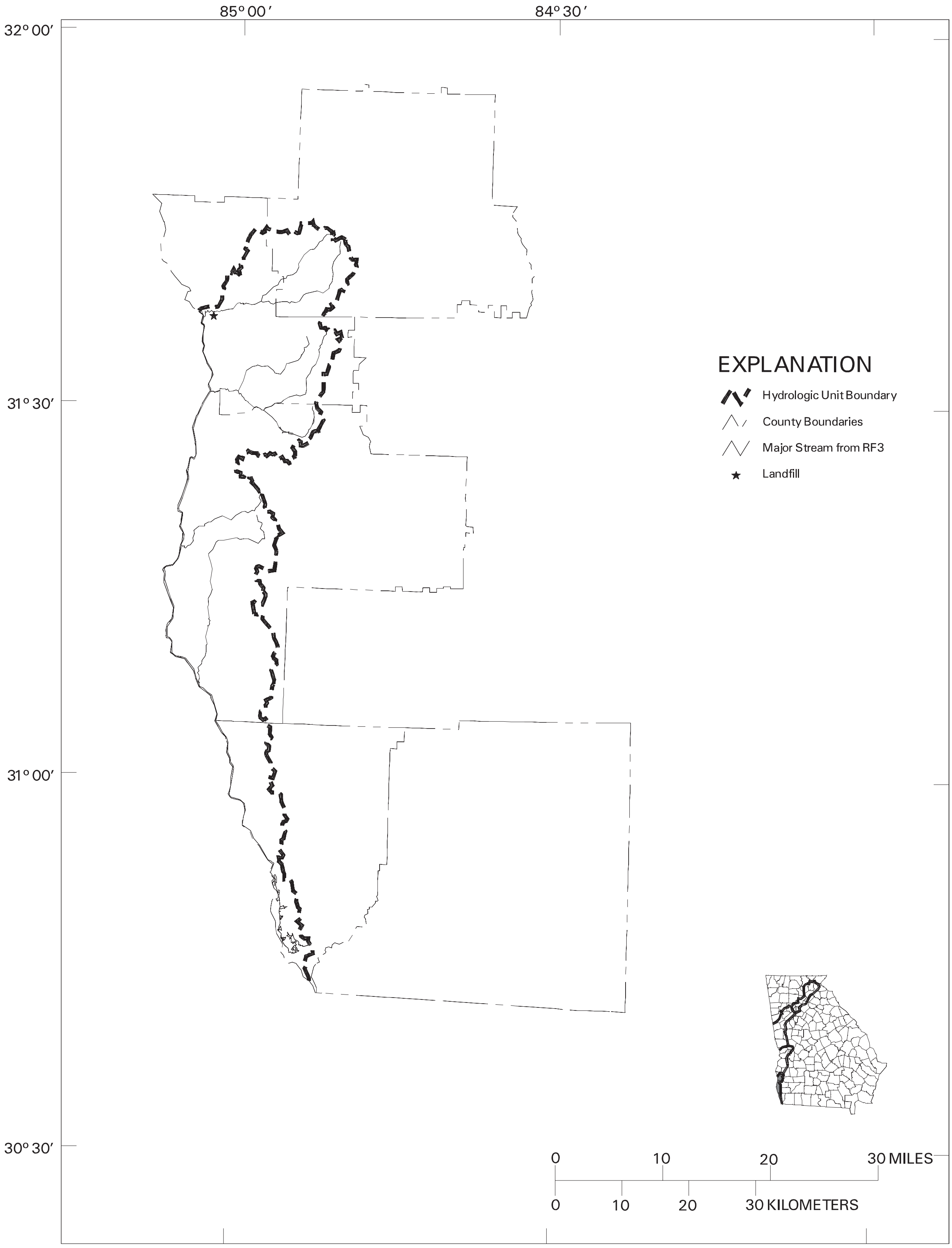


Figure 4-13. Landfills, Lower Chattahoochee River Basin, HUC 03130004

4.1.2.1 Nonpoint Sources from Agriculture

Agricultural operations can contribute stressors to water bodies in a variety of ways. Tillage and other soil disturbing activities may promote erosion and loading of sediment to water bodies, unless controlled by management practices. Nutrients contained in fertilizers, animal wastes, or natural soils may be transported from agricultural land to streams in either sediment-attached or dissolved forms. Loading of pesticides and pathogens is also of concern for various agricultural operations.

Sediment and Nutrients

Sediment is the most common pollutant resulting from agricultural operations. It consists mainly of mineral fragments resulting from the erosion of soils, but may also include crop debris and animal wastes. Excess sediment loads can damage aquatic habitat by smothering and shading food organisms, altering natural substrate, and destroying fish spawning areas. Runoff with elevated sediment concentrations can also scour aquatic habitat causing significant impacts to the biological community. Excess sediment may also increase water treatment costs, interfere with recreational uses of water bodies, create navigation problems, and increase flooding damage. In addition, a high percentage of nutrients lost from agricultural lands, particularly phosphorus, is transported attached to sediment. Many organic chemicals used as pesticides or herbicides are also transported predominantly attached to sediment.

Agriculture can be a significant source of nutrients, which can lead to excess or nuisance growth of aquatic plants and depletion of dissolved oxygen. The nutrients of most concern from agricultural land uses are nitrogen (N) and phosphorus (P), which may derive from commercial fertilizer or land application of animal wastes. Both nutrients assume a variety of chemical forms, including soluble ionic forms (nitrate and phosphate) and less soluble organic forms. Less soluble forms tend to travel with sediment, while more soluble forms move with water. Nitrate-nitrogen is very weakly adsorbed by soil and sediment, and is therefore transported entirely in water. Because of its mobility, the major route of nitrate loss is to streams by interflow or to groundwater in deep seepage.

Phosphorus transport is a complex process involving different components of phosphorus. Soil and sediment contain a pool of adsorbed phosphorus which tends to be in equilibrium with the phosphorus in solution (phosphate) as water flows over the soil surface. The concentrations established in solution are determined by soil properties and fertility status. Adsorbed phosphorus attached to soil particles suspended in runoff also equilibrates with the phosphorus in solution.

In 1993, the Soil Conservation Service (SCS, now NRCS) completed a study to identify hydrologic units in Georgia with high potential for nonpoint source (NPS) pollution problems resulting from agricultural land uses (SCS, 1993). This study concluded that there is not a major statewide agricultural pollution problem in Georgia. However, the assessment shows that some watersheds have sufficient agricultural loadings to potentially impair their designated uses, based on estimates of transported sediments, nutrients, and animal waste from agricultural lands.

In the SCS study, estimates of potential agricultural NPS loads were based on county units. An erosion index was developed for each county that included soil erodibility, slope, and slope length. Each county was assigned to one of seven Major Land Resource Areas on which a joint

Agricultural Research Service (ARS) and EPA study (USDA Utilization Research Report No. 6 and EPA-600/2-79-059) gave estimates of annual runoff, pounds per acre of dissolved nitrogen and phosphorus from applied animal waste, and a method of converting pound per acre to parts per million (ppm) concentration in runoff from agricultural lands.

Data on agricultural lands, land use, and animal units were developed for each county and reviewed and modified by the local agricultural Field Advisory Committee. Erosion and sediment yield data bases were calculated and compiled for agricultural lands based on county erosion indexes and cover factors. Nutrient needs were also developed by county and watershed. Potential nutrient loads were based on a worst case scenario where nutrients needed for agricultural lands are provided entirely from commercial fertilizer and animal waste is not managed for its nutrient value. Erosion and sediment yields were developed based on county cropland and grassland data. Estimates include sheet, rill, and ephemeral gully erosion, factored by a delivery ratio to the streams.

Estimates of sediment, nitrogen and phosphorus loads from agricultural lands were calculated by SCS (1993) on a county basis, then converted to average concentrations per event. These loads represent movement from agricultural fields, not delivery to waters, which will be less. Reporting on a concentration basis helps account for the fact that county boundaries generally do not coincide with watershed boundaries. Estimates for agricultural loading for those counties with significant land area within the Chattahoochee River Basin are summarized in Table 4-7.

Based on these analyses, SCS (1993) and the Georgia Soil and Water Conservation Commission (GSWCC) also identified specific watersheds within the Chattahoochee River Basin which have potential water quality problems associated with agricultural runoff. The identification was updated by the GSWCC for inclusion in Georgia's 1995 305(b) report and is shown in Table 4-8. The list represented the best effort by the Federal and State agricultural agencies to identify potential water problem areas, but was not based on documented water quality problems. Mileages presented are based on taking a flat percentage of stream miles within the hydrologic unit and represent an estimate only.

In July and August of 1996, EPD conducted additional biological assessment of the waters listed in Table 4-8 to determine which of these waters should be added to Georgia's Section 303(d) list of water quality limited segments. Those waters designated with a "3" under 303(d) Priority Ranking were added to the § 303(d) list in December 1996. Those designated with a "0" were determined not to be water quality limited segments based on the July-August 1996 sampling.

Animal waste

Besides contributing to nutrient loads, animal waste may contribute high loads of oxygen demanding chemicals and bacterial and microbial pathogens. The waste may reach surface waters through direct runoff as solids or in their soluble form. Soluble forms may reach groundwater through runoff, seepage, or percolation and surface water as return flow. The organic materials place an oxygen demand on the receiving waters during their decomposition

Table 4-7. Estimated Loads from Agricultural Lands by County (SCS, 1993)

County	Acres with nutrient application	Sediment (tons)	Sediment (ppm)	Nitrogen (tons)	Nitrogen (ppm)	Phosphorus (tons)	Phosphorus (ppm)
Hydrologic Unit 03130001, Upper Chattahoochee River							
DeKalb	990	199	6.6	2	0.07	1	0.022
Forsyth	36057	27381	26.6	330	0.32	69	0.067
Gwinnett	16491	2761	5.9	75	0.16	18	0.038
Habersham	36763	57644	54.8	489	0.47	99	0.095
Hall	44459	33924	26.8	453	0.36	87	0.069
Lumpkin	17675	17876	35.6	340	0.68	41	0.081
White	16152	33915	73.1	244	0.053	54	0.118
Hydrologic Unit 03130002, Middle Chattahoochee River, Atlanta to Columbus							
Carroll	74757	57736	24.4	307	0.15	101	0.048
Cobb	8054	8838	38.8	25	0.11	10	0.044
Coweta	39214	39641	34.3	114	0.10	45	0.040
Douglas	9533	8983	33.3	27	0.10	11	0.039
Fulton	15476	12513	28.6	33	0.07	13	0.029
Harris	30275	18420	21.0	53	0.06	22	0.025
Heard	22983	16784	25.1	98	0.15	31	0.047
Meriwether	60489	45424	25.1	133	0.08	53	0.031
Paulding	42409	9882	8.2	58	0.05	20	0.017
Troup	30695	5581	6.4	28	0.03	11	0.013
Hydrologic Unit 03130003, Middle Chattahoochee River, Columbus to Lake W.F. George							
Chattahoochee	3580	2265	53.0	6	0.14	2	0.056
Marion	25465	12902	10.6	256	0.85	99	0.330
Muscogee	3801	418	9.3	1	0.03	1	0.012
Quitman	7952	15055	73.7	40	0.21	16	0.081
Randolph	67758	120441	60.3	317	0.19	124	0.075
Stewart	30965	47609	58.3	131	0.17	50	0.067
Talbot	28085	13551	16.6	42	0.05	17	0.021
Hydrologic Unit 03130004, Lower Chattahoochee River							
Clay	33474	53163	56.6	143	0.18	55	0.068
Early	123292	146088	32.6	391	0.13	153	0.051
Seminole	74143	51918	24.1	148	0.08	56	0.031

Note: Mass estimates are based on whole county. Concentration estimates are average event runoff concentration from agricultural lands.

Table 4-8. List of Watersheds Potentially Impacted by Agricultural Nonpoint Source Pollution in the Chattahoochee River Basin

HUC	Watershed Name - County	River Miles	§ 303(d) Priority
03130001	Soque River - Habersham	21	3
03130001	Hazel Creek - Habersham	6	3
03130001	Upper Chattahoochee River - White and Habersham	11	0
03130001	Mud Creek - Habersham	15	3
03130001	White and Mossy Creeks - Hall and White	10	3
03130001	Tesnatee Creek - White	7	0
03130001	North Chestatee River - Lumpkin	7	0
03130001	Wahoo and Little Creek - Hall, Lumpkin and White	24	0
03130001	Upper Chestatee River - Lumpkin	14	0
03130002	Dog River - Douglas and Carroll	20	0
03130002	Snake Creek - Carroll and Heard	12	0
03130004	Kolimoki Creek - Clay and Early	15	0

adversely impacting fisheries; and cause other problems with taste, odor, and color. The possible presence of pathogens including fecal bacteria that impact human health is of particular concern when waters are contaminated by waste from mammals. In addition to bacteria, cattle waste may be an important source of the infectious oocysts of the protozoan parasite *Cryptosporidium parvum*.

Pesticides

Pesticides applied in agricultural production may be insoluble or soluble and include herbicides, insecticides, miticides and fungicides. Their primary transport mode is direct surface runoff, either in dissolved form or attached to sediment particles. Some pesticides may cause acute and chronic toxicity problems in the water or throughout the entire food chain. Others are suspected human carcinogens, although the use of these pesticides has generally been discouraged in recent years.

Use of agricultural pesticides/herbicides within the basin is described in Stell *et al*. (1995). For the Flint and Chattahoochee basins combined, data compiled from the Georgia Herbicide Use Survey Summary (Monks and Brown, 1991) indicate that bentazon, paraquat, 2,4-DP, methanearsonates (MSMA/DSMA), alachlor, and pendimethalin were used to treat the largest number of acres (from 307,000 to 205,000 acres); and alachlor, MSMA/DSMA, fluometuron, atrazine, metolachlor, and bentazon were applied in the greatest quantities (from 506,000 to 185,000 pounds of active ingredient). Since 1990, the use of alachlor in Georgia has decreased dramatically (about 98 percent) in response to market conditions, as peanut wholesalers will no longer buy peanuts treated with alachlor. Metolachlor, rather than alachlor, is now being applied to peanuts.

Non-herbicide pesticide use is difficult to estimate. According to Stell *et al*. (1995), pesticides other than herbicides are currently used only when necessary to control some type of infestation (nematodes, fungi, insects), and chlorothalonil, aldicarb, chlorpyrifos, methomyl, thiodicarb, carbaryl, acephate, fonofos, methyl parathion, terbufos, disulfoton, phorate, triphenyltin hydroxide (TPTH), and synthetic pyrethroids/pyrethrins are commonly used. Application periods of the principal agricultural pesticides span the calendar year in the basin; however, agricultural pesticides are applied most intensively and on a broader range of crop types from March 1 to September 30 in any given year.

It should be noted that past uses of persistent agricultural pesticides which are now banned may continue to impact water quality within the basin, particularly through residual concentrations present in bottom sediments. The survey of pesticide concentration data by Stell *et al*. (1995) found that nearly 56 percent of the analyses in water and sediment having concentrations at or above minimum reporting levels were for two groups: DDT and metabolites, and chlordane and related compounds (heptachlor, heptachlor epoxide), while dieldrin was also frequently detected. All these pesticides are now banned by USEPA for use in the United States, but may persist in the environment for long periods of time.

4.1.2.2 Nonpoint Sources from Urban, Industrial and Residential Lands

Water quality in urban waterbodies is the result of both point source discharges and the impact of diverse land activities in the drainage basin (i.e., nonpoint sources). One of the most important sources of environmental stressors in the Chattahoochee basin, and particularly in the developed and rapidly growing areas around Atlanta, Lake Lanier, and Columbus, is diffuse runoff from urban, industrial, and residential land uses (jointly referred to as "urban runoff"). Nonpoint source contamination can lead to impairment in streams draining extensive commercial and industrial areas, where stormwater runoff, unauthorized discharges, and accidental spills may contribute to pollutant loading. Wet weather urban runoff can carry high concentrations of many of the same pollutants found in point source discharges, such as oxygen demanding waste, suspended solids, synthetic organic chemicals, oil and grease, nutrients, lead and other metals, and bacteria. The major difference is that urban runoff only occurs intermittently, in response to precipitation events.

The characteristics of nonpoint urban nonpoint sources of pollution are generally similar to those of NPDES permitted stormwater discharges (Section 4.1.1.2). Separate stormwater systems, however, are typically found in developed areas with high imperviousness and, frequently, sanitary sewer systems. Nonpoint urban sources of pollution include drainage from some builtup areas with similar characteristics, but also includes less highly developed areas with greater amounts of pervious surfaces. Nonpoint urban runoff is likely to include a larger percentage of drainage from areas including lawns, gardens, and septic tanks, all of which may be sources of nutrient load.

At present, little site-specific data are available to quantify loading in nonpoint urban runoff in the Chattahoochee River Basin, although estimates of loading rates by land use types have been widely applied in other areas. Peters and Kandell (1997) present a water quality index for streams in the Atlanta region, based primarily on nutrients and nutrient-related parameters because data for metals, organics, biological conditions, and suspended sediment were generally unavailable. They report that the annual average index of water quality conditions generally improved at most long-term monitoring sites between 1986 and 1995. However, conditions markedly worsened between 1994 and 1995 at several sites where major development was ongoing.

Urban and suburban land uses are also a potential source of pesticides and herbicides through application to lawns and turf, roadsides, and gardens and beds. Stell *et al*. (1995) provide a summary of usage in the Atlanta Metropolitan Statistical Area (MSA). The herbicides most commonly used by the lawn-care industry are combinations of dicamba, 2,4-D, mecoprop (MCPP), 2,4-DP, and MCPA, or other phenoxy-acid herbicides, while most commercially available weed control products contain one or more of the following compounds: glyphosphate, methyl sulfometuron, benefin (benfluralin), bensulide, acifluorfen, 2,4-D, 2,4-DP, or dicamba. Atrazine was also available for purchase until it was restricted by the State of Georgia on January 1, 1993. The main herbicides used by local and State governments are glyphosphate, methyl sulfometuron, MSMA, 2,4-D, 2,4-DP, dicamba, and chlorsulforon. Herbicides are used for preemergent control of crabgrass in February and October, and in the summer for postemergent control. Data from the 1991 Georgia Pest Control Handbook (Delaplane, 1991) and a survey of CES and SCS personnel conducted by Stell *et al*. indicate that several insecticides could be considered ubiquitous in urban/suburban use, including chlorpyrifos, diazinon, malathion, acephate, carbaryl, lindane, and dimethoate. Chlorothalonil, a fungicide, is also widely used in urban and suburban areas.

Stell *et al*. estimated that there are about 190 mi^2 of lawns in the Atlanta MSA part of the Chattahoochee and Flint basins, of which home owners apply pesticides to about 120 mi^2 and the lawn care industry applies pesticides to about 23 mi^2, with the remainder of lawns untreated. Other types of urban/suburban land receiving pesticide treatment include golf courses, roadsides, local government land, parks, industrial land, and schools.

Urban and residential stormwater also potentially includes pollutant loads from a number of other terrestrial sources:

> **Septic Systems**. Poorly sited and improperly operating septic systems can contribute to the discharge of pathogens and oxygen-demanding pollutants to receiving streams. This problem is addressed through septic system inspections by the appropriate County Health Department, extension of sanitary sewer service and local regulations governing minimum lot sizes and required pump-out schedules for septic systems.
>
> **Leaking Underground Storage Tanks**. The identification and remediation of leaking underground storage tanks is the responsibility of the EPD Land Protection Branch. Petroleum hydrocarbons and lead are typically the pollutants associated with LUSTs.

4.1.2.3 Nonpoint Sources from Forestry

By area, forest is the dominant land cover in the Chattahoochee Basin, accounting for 73% of land cover in 1991. Undisturbed forest land is generally associated with low rates of stressor loading compared to other land uses, and conversion of forest to urban/residential land uses is often associated with water quality degradation. Within the Chattahoochee basin, the area classified as commercial forest land has decreased by approximately 82,000 acres since 1982. Silvicultural operations may also serve as sources of stressors, particularly excess sediment loads to streams, when proper management practices are not followed. From a water quality standpoint, woods roads pose the greatest potential threat of any of the typical forest practices. It has been documented that 90 percent of the sediment that entered streams from a forestry operation was directly related to either poorly located or poorly constructed roads. Estimates in Georgia are that there are approximately 3,000 annual harvesting operations conducted in the state so the potential impact to water quality from erosion and sedimentation is great if Best Management Practices (BMPs) are not adhered to.

Silviculture is also a potential source of pesticides/herbicides. According to Stell *et al*. (1995), pesticides are mainly applied during site preparation after clear-cutting and during the first few years of new forest growth. Site preparation occurs on a 25-year cycle on most pine plantation land, so the area of commercial forest with pesticide application in a given year is relatively small. The herbicides glyphosate (Accord), sulfometuron methyl (Oust), hexazinone (Velpar), imazapyr (Arsenal), and metsulfuron methyl (Escort) account for 95% of the herbicides used for site preparation to control grasses, weeds, and broadleaves in pine stands. Dicamba, 2,4-D, 2,4,-DP (Banvel), triclopyr (Garlon), and picloram (Tordon) are minor use chemicals used to control hard to kill hardwoods and kudzu. The use of triclopyr and picloram has decreased since the early 1970's. Most herbicides are not mobile in the soil and are targeted to plants, not animals. Control of insects and diseases are not widely practical except in commercial forest tree nurseries which is an extremely minor land use. Insects are controlled by chlorpyrifos, diazinon, malathion, acephate, carbaryl, lindane, and dimethoate. Diseases are controlled using chlorothalonil, dichloropropene, and mancozeb. Applications made following the label and with regard to BMPs pose no threat to water quality.

4.1.2.4 Atmospheric Deposition

Atmospheric deposition can be a significant source of nitrogen and acidity in watersheds. Nutrients from atmospheric deposition, primarily nitrogen, are distributed throughout the entire basin in precipitation. The primary source of nitrogen in atmospheric deposition is nitrogen oxide emissions from combustion of fossil fuels. The rate of atmospheric deposition is a function of topography, nutrient sources, and spatial and temporal variations in climatic conditions.

Frick *et al*. (1996) report estimates of nitrogen loading from atmospheric deposition to the Chattahoochee River Basin as of 1990. Over the whole Chattahoochee basin (Georgia, Alabama, and Florida) they estimated an annual input of approximately 10,000 tons of nitrogen via atmospheric deposition, distributed as follows:

Hydrologic unit code	Subbasin Name	Atmospheric Deposition (tons of N per year)
03130001	Upper Chattahoochee	1,900
03130002	Middle Chattahoochee, Atlanta to Columbus	3,600
03130003	Middle Chattahoochee, Columbus to Lake George	3,400
03130004	Lower Chattahoochee	1,500

Data are not available nationally to estimate phosphorus input from atmospheric deposition; however, this component is expected to be of minor significance (Frick et al., 1996).

Atmospheric deposition may also be a source of certain mobile toxic pollutants. In particular, mercury found in fish in the lower Chattahoochee basin is thought to derive in part from atmospheric deposition, enhanced by the fact that Coastal Plain sites are characterized by physicochemical settings that enhance the formation of biologically available methylmercury

(Couch, 1997). Atmospheric deposition also contributes small background loads of PCBs and other organic chemicals.

4.1.3 Flow and Temperature Modification

Many species of aquatic life are adapted to specific flow and temperature regimes. In addition, both flow and temperature affect the dissolved oxygen balance in water, and changes in flow regime can have important impacts on physical habitat. Temperature is particularly critical for the coldwater trout fishery. Georgia is located at the extreme southern edge of trout habitat, and therefore many trout waters approach or exceed maximum tolerable temperatures during the hottest summer months, even under natural conditions. Trout need cold water to survive and reproduce well, so any practices that cause stream warming can have adverse effects.

Thus, flow and temperature modifications can be important environmental stressors. They also interact with one another to affect the oxygen balance: Flow energy helps control reaeration rate, while water temperature controls the solubility of dissolved oxygen, and higher water temperatures reduce oxygen solubility and thus tend to reduce dissolved oxygen concentrations. Further, increased water temperature increases the rate of metabolic activity in natural waters, which in turn may increase oxygen consumption by aquatic species.

Natural flows in the Chattahoochee have been altered by the construction of numerous dams. With the completion of Buford Dam in 1956, 48 miles upstream from Atlanta and forming Lake Sidney Lanier, the Chattahoochee River downstream became a fully flow regulated river. Flow regulation by dams for hydropower and other uses control flow rates in most of the Chattahoochee.

The segments of the Chattahoochee between Buford Dam and West Point Lake (HUC 03130001 and 03130002) are the subject of the Chattahoochee River Modeling Project (Law Environmental, 1994). As part of this project, current knowledge regarding the effects of dams within this segment of the river were summarized:

Buford Dam and releases from Lake Sidney Lanier typically dominate flows in the Chattahoochee. The maximum discharge rate from Buford Dam during peak power generation is about 8,400 ft^3/s. Each period of hydroelectric power generation moves water downstream in the form of a wave or pulse, which can be observed at gaging stations along the entire reach of the river between Buford Dam and West Point Lake, a distance of more than 100 river miles (USGS, 1979).

The cycle of dam releases follows a weekly schedule with five weekdays of short periods of power generation followed by two weekend days with little or no generation. During a typical week, power is generated for several hours each weekday and infrequently on weekends. The main turbines are operated for peaking power during the middle of the day; during off peak hours a small turbine is operated to maintain 550 cfs for water supply and downstream water quality. Superimposed on these daily and weekly cycles is an annual pattern caused by operations for flood control. During the fall more water is released to provide flood storage for winter and spring rainfall runoff.

Lake Lanier undergoes thermal stratification during the early summer, with warm surface waters overlying colder bottom waters. Stratification reduces internal circulation of water, and limits the vertical movement of biological or chemical material and dissolved oxygen.

Consequently, low dissolved oxygen concentrations at greater depths occur during certain periods of the year. Hydroelectric power generation at Buford Dam withdraws water from these depths resulting in cold water discharges that can be low in dissolved oxygen between July and December. After the period of summer thermal stratification there is usually a fall turnover when the temperature stratification is broken and the lake becomes fully mixed by late December. This cycle of stratification and destratification occurs annually and affects the water quality of releases from Buford Dam.

For these reasons, releases for hydroelectric power production can have a significant cooling effect on river temperatures below Buford Dam, especially during the period of March to November, and a warming effect during the months of December and January. During most of the year, the water temperature in the tailwater immediately downstream of Lake Lanier is normally between 7°C and 15°C except in October when temperatures may exceed 20°C. At Paces Ferry, 46 miles downstream, much of the cooling effect noted at Buford Dam has dissipated and river water temperatures more closely approximate a natural annual pattern (USGS, 1979).

The flow and water quality dynamics of the Chattahoochee River resulting from hydroelectric power generation releases at Buford Dam are shown in Figure 4-14, representing in-stream monitoring data collected in August 1993 at State Road 20, less than three miles below the dam. The graph shows sudden changes in depth, water temperature, and dissolved oxygen. Water depth is directly related to river flow and the rapidly rising depths during the week indicate releases from Buford Dam. The data show that the power wave at State Road 20 produces a two to three degree change in water temperature and a 2 mg/l change in dissolved oxygen over several hours during weekday operation.

Morgan Falls Dam impounds Bull Sluice Lake at RM 312.60, with a surface water elevation of approximately 866 ft msl. The lake is characterized by low flow velocities, broad shallow pools, and embayments, and has experienced extensive sediment deposition since its creation in 1904. Sediment deposition has decreased the average depth to approximately 5 feet and has created wetlands attractive to recreation and fishing in the lake. The broad and shallow nature of Bull Sluice Lake can elevate lake water temperatures and temperatures in subsequent releases from Morgan Falls Dam.

Georgia Power Company operates the hydroelectric power plant at Morgan Falls Dam, and also augments weekend low flows (created by operations at Buford Dam) for downstream water supply. A contract exists between the City of Atlanta and the Georgia Power Company requiring Georgia Power to release water according to a specified schedule to provide a minimum flow of 750 cfs at all times at the City of Atlanta water intake (RM 300.52) and flows in excess of 750 cfs during the daytime (City of Atlanta and Georgia Power Company, 1957).

Morgan Falls Dam began producing electric power in October, 1904. Morgan Falls Dam is a "run-of-the-river" hydroelectric power facility with limited storage; thus it only partially regulates river flows. Like Buford Dam, power generation at Morgan Falls Dam can affect downstream river flows and temperature. Its impact on flow and water temperature is, however, considered to be minimal (USGS, 1979).

Water temperatures within the Chattahoochee River Modeling Project study area are determined by the combined effects of dam operation and tributary water temperature. Above

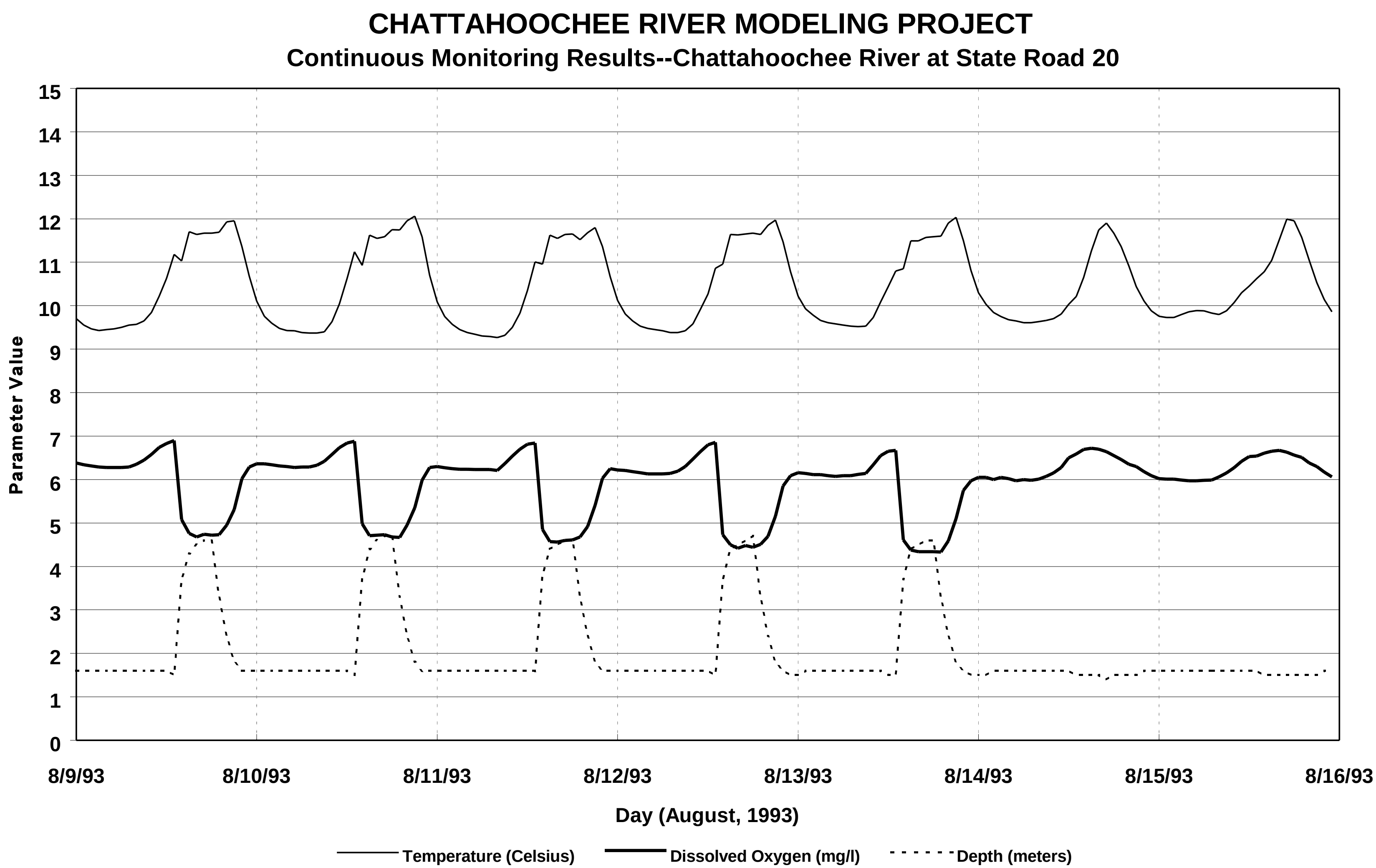


Figure 4-14. Dynamic Water Quality Resulting from Buford Dam Releases

Morgan Falls Dam, the cold water discharge from Buford Dam constitutes a large percentage of the river flow and tributary inflows have little impact on temperature during routine dry-weather operations. However, storm events which occur during periods of minimum releases from Buford Dam have caused river water temperatures to increase to a point where trout were stressed or even died (ARC, 1992). Impervious surfaces in urban areas increase water temperatures in stormwater runoff. The temperature profile in the river is thus determined by a combination of dam operation and nonpoint stormwater runoff.

Within Hydrologic Unit 03130002, dissolved oxygen violations are also noted below West Point Dam, attributable to hydropower releases of bottom water. In Hydrologic Unit 03130004 similar problems are associated with hydropower releases from Lake W. F. George.

4.1.4 Physical Habitat Alteration

Many forms of aquatic life are sensitive to physical habitat disturbances. Probably the major disturbing factor is erosion and loading of excess sediment, which changes the nature of the stream substrate. Trout waters are particularly sensitive to sedimentation as trout need clean substrate to survive and reproduce well. Thus, any land use practices that cause excess sediment input can have significant impacts. Because of rapid development in the mountainous areas, the quality of trout streams is often compromised by sedimentation from land disturbing activities.

Physical habitat disturbance is also evident in many urban streams. Increased impervious cover in urban areas an result in high flow peaks, which increase bank erosion. In addition, construction and other land disturbing activities in these areas often provides an excess sediment load, resulting of choking of the natural substrate and physical form of streams with banks of sand and silt.

Another important form of physical habitat disruption is loss of riparian tree cover. Under natural conditions, smaller streams in Georgia are shaded by a tree canopy. If this canopy is removed the resulting direct sunlight can result in increased water temperatures with adverse effects on native aquatic life. Habitat disturbance through construction of small impoundments can also raise water temperatures.

4.2 Stressor Summary

Section 4.1. described the major sources of loads of pollutants (and other types of stressors) to the Chattahoochee basin. What happens in the river, however, is often the result of the combined impact of many different types of loading, including point and nonpoint sources. For instance, excess loads of nutrients may represent the net effect of wastewater treatment plant discharges, runoff from agriculture, runoff from residential lots, and other sources. Accordingly, Section 4.2 brings together the information contained in Section 4.1. to focus on individual stressor types, as derived from all sources.

4.2.1 Nutrients

All plants require certain nutrients for growth, including the algae and rooted plants found in lakes, rivers, and streams. Nutrients required in the greatest amounts include nitrogen and phosphorus. Some loading of these nutrients is needed to support normal growth of aquatic plants, an important part of the food chain. Too much loading of nutrients can, however, result in an over-abundance of algal growth with a variety of undesirable impacts. The condition of excessive nutrient-induced plant production is known as eutrophication, and waters affected by this condition are said to be eutrophic. Eutrophic waters often experience dense blooms of algae, which can lead to unaesthetic scums and odors and interfere with recreation. In addition, overnight respiration of living algae, and decay of dead algae and other plant material, can deplete oxygen from the water, stressing or killing fish. Eutrophication of lakes typically results in a shift in fish populations to less desirable, pollution tolerant species. Finally, eutrophication may result in blooms of certain species of blue-green algae which have the capability of producing toxins.

For freshwater aquatic systems, the nutrient which is in the shortest supply relative to plant demands is usually phosphorus. Phosphorus is then said to be the limiting nutrient, because the concentration of phosphorus limits potential plant growth. Control of nutrient loading to reduce eutrophication thus focuses on phosphorus control.

Point and nonpoint sources to the Chattahoochee also discharge large quantities of nitrogen, but nitrogen is usually present in excess of amounts required to match the available phosphorus. Nitrogen (unlike phosphorus) is also readily available in the atmosphere and ground water, so it is not usually the target of management to control eutrophication in fresh water. The bulk of the nitrogen in fresh water systems is found in one of three ionic forms: ammonium (NH_4^+), nitrite (NO_2^-), and nitrate (NO_3^-). Nitrite and nitrate are more readily taken up by most algae, but ammonia is of particular concern because it can be toxic to fish and other aquatic life. Accordingly, wastewater treatment plant upgrades have focused on reducing the toxic ammonia component of discharges, with corresponding increase in the nitrate fraction.

The major sources of nutrient loading in the Chattahoochee basin are wastewater treatment facilities, urban runoff and stormwater, and agricultural runoff. Concentrations found within rivers and lakes of the Chattahoochee basin represent a combination of a variety of point and nonpoint source contributions.

Point source loads can be quantified from permit and effluent monitoring data, but nonpoint loads are difficult to quantify. Rough estimates of average nutrient loading rates from agriculture are available (Section 4.1.2.1); however, nonpoint loads from urban/residential sources in the basin have not yet been quantified. The net load arising from all sources may, however, be examined from instream monitoring. Long term trends in nutrients within the Chattahoochee River Basin for 1972–90 are summarized by Frick *et al*. (1996). An even more informative picture is obtained by examining results from EPD long-term trend monitoring stations from 1968 to present.

Trends in loading of total phosphorus can be seen by examining results at three stations: Chattahoochee River at Cobb Co. water intake (upstream of Atlanta just below Morgan Falls Dam); Chattahoochee River at State Road 92 (below the Atlanta metropolitan sewage outfalls), and Chattahoochee River at Omaha (just above Lake W. F. George).

Upstream of Atlanta, phosphorus loading is due to a combination of nonpoint sources and loading from several smaller wastewater treatment plants above Morgan Falls Dam (Figure 4-15). The figure shows individual trend-monitoring measurements since 1969 as points.

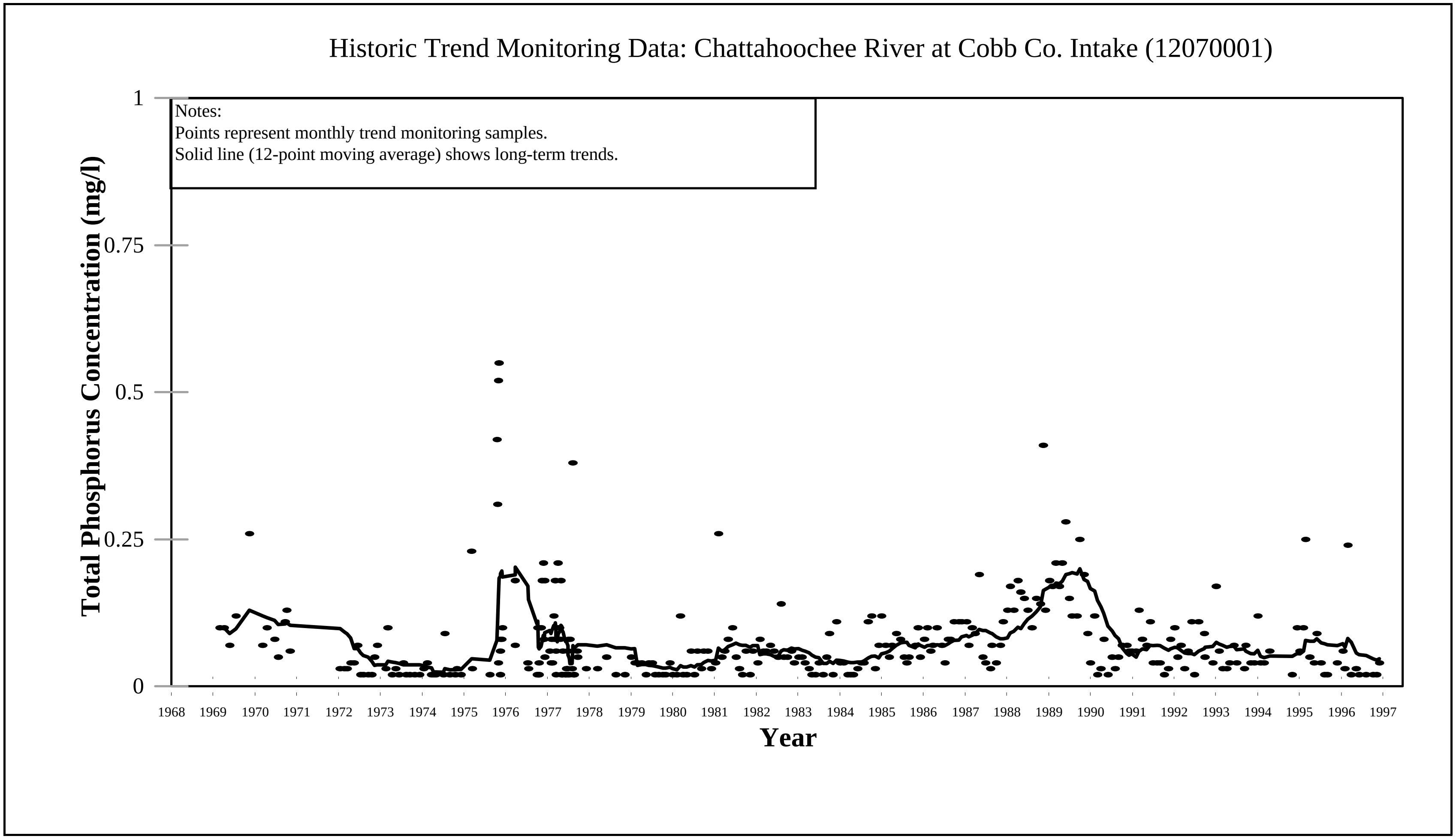


Figure 4-15. Total Phosphorus Concentration, Chattahoochee River at Cobb Co. Intake above Atlanta

Superimposed on these points is a moving-average line, representing long-term trends. The median (50th percentile) phosphorus concentration observed at this station is 0.05 mg/l, and the maximum observed was 0.55 mg/l (in 1975). A moderate increasing trend between 1980 and 1989 coincides with population growth and expansion of the Fulton County Big Creek wastewater treatment plant above Morgan Falls Dam. This trend was reversed in 1990, reflecting EPD requirements on wastewater treatment plants and legislation restricting the use of phosphate detergents.

In the Chattahoochee at State Road 92, below Atlanta, phosphorus concentrations are much higher due to input from the Atlanta area wastewater treatment plans (Figure 4-16). For 1968 through 1985, the median of total phosphorus concentration observations instream was 0.44 mg/l, and the maximum observed was 3.6 mg/l. During 1986 to 1988, concentration increased, due primarily to diversion of Atlanta wastewater from the headwaters of the Flint basin to the Chattahoochee basin plants. Since 1989, both the magnitude and seasonal variability of phosphorus concentrations at this station have declined dramatically, reflecting the extensive treatment plant upgrades required by EPD for phosphorus removal coupled with legislation restricting use of phosphate detergents. For the period 1995-96, the median concentration at this station was 0.11 mg/l, or only one-fourth of the concentrations observed prior to 1986.

Below Atlanta, the Chattahoochee passes through a series of major impoundments, beginning with West Point Lake. Because phosphorus is taken up by plants and also tends to sorb to sediment particles, substantial amounts of phosphorus load are removed within these reservoirs. At the trend monitoring station at Omaha, just above Lake W. F. George, total phosphorus concentrations have remained consistently moderate (Figure 4-17), with a median of 0.08 mg/l, despite inputs upstream from the Columbus wastewater treatment plant.

Trends in nitrogen loading have also been affected by treatment plant upgrades. A plot of ammonia concentration at State Road 92 (Figure 4-18) shows a dramatic drop in response to the 1989 treatment plant upgrades, going from a median of 0.91 mg/l (as N) in 1985-88 to a median of 0.22 mg/l in 1993-96. Total nitrite-plus-nitrate concentrations (Figure 4-19), in contrast, have shown a long-term upward trend, reflecting wastewater treatment plant conversion of ammonia to nitrite/nitrate, as well as increased urban runoff contributions as population and development have increased.

4.2.2 Oxygen Depletion

Oxygen is required to support aquatic life, and Georgia water quality standards specify minimum and daily average dissolved oxygen concentration standards for all waters. Problems with oxygen depletion in rivers and streams of the Chattahoochee basin are associated with oxygen demanding wastes from point and nonpoint sources and hydropower operations which release oxygen-depleted bottom water from reservoirs. Historically, the greatest threat to maintaining adequate oxygen levels to support aquatic life has come from the discharge of oxygen-demanding wastes from wastewater treatment plants. Treatment upgrades and more stringent permit limits have reduced this threat substantially.

Figure 4-20 shows the long-term trends in dissolved oxygen concentrations in the Chattahoochee at State Road 92, below Atlanta. There is a general improving trend, with few violations of the dissolved oxygen standard of 5 mg/l (daily average) in recent years. The most

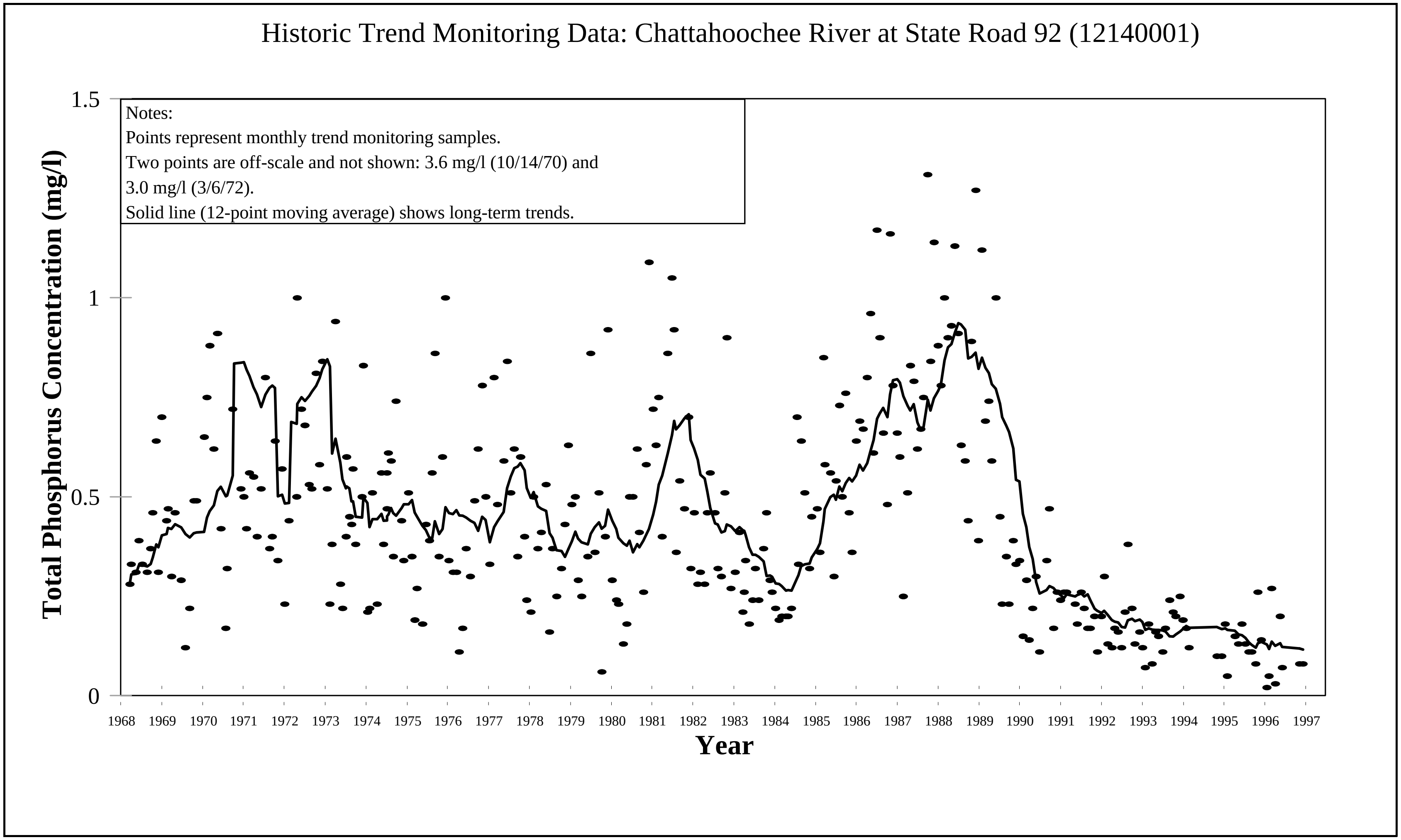


Figure 4-16. Total Phosphorus Concentration, Chattahoochee River at Hwy. 92 below Atlanta

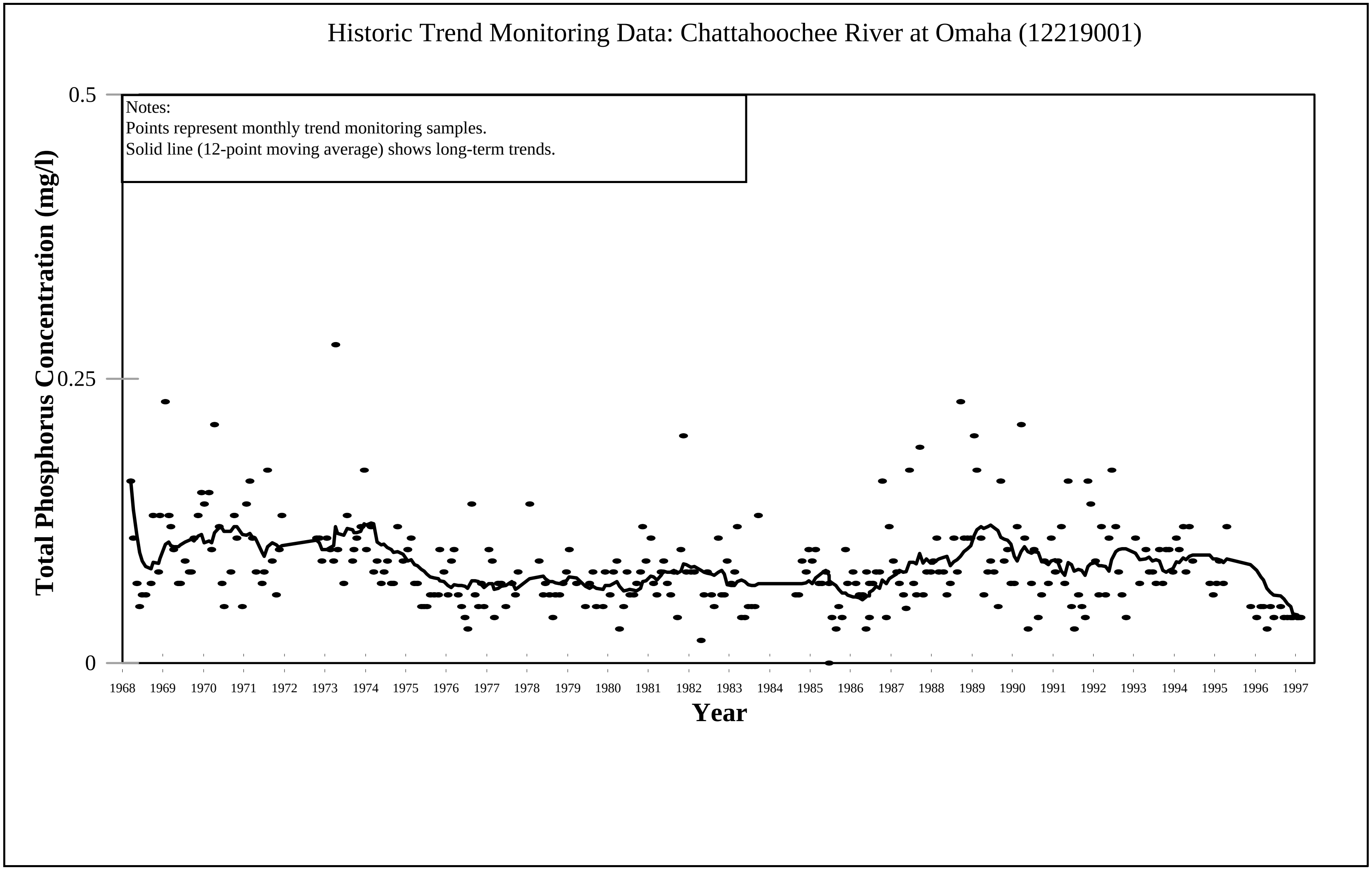


Figure 4-17. Total Phosphorus Concentration, Chattahoochee River at Omaha above Lake W. F. George

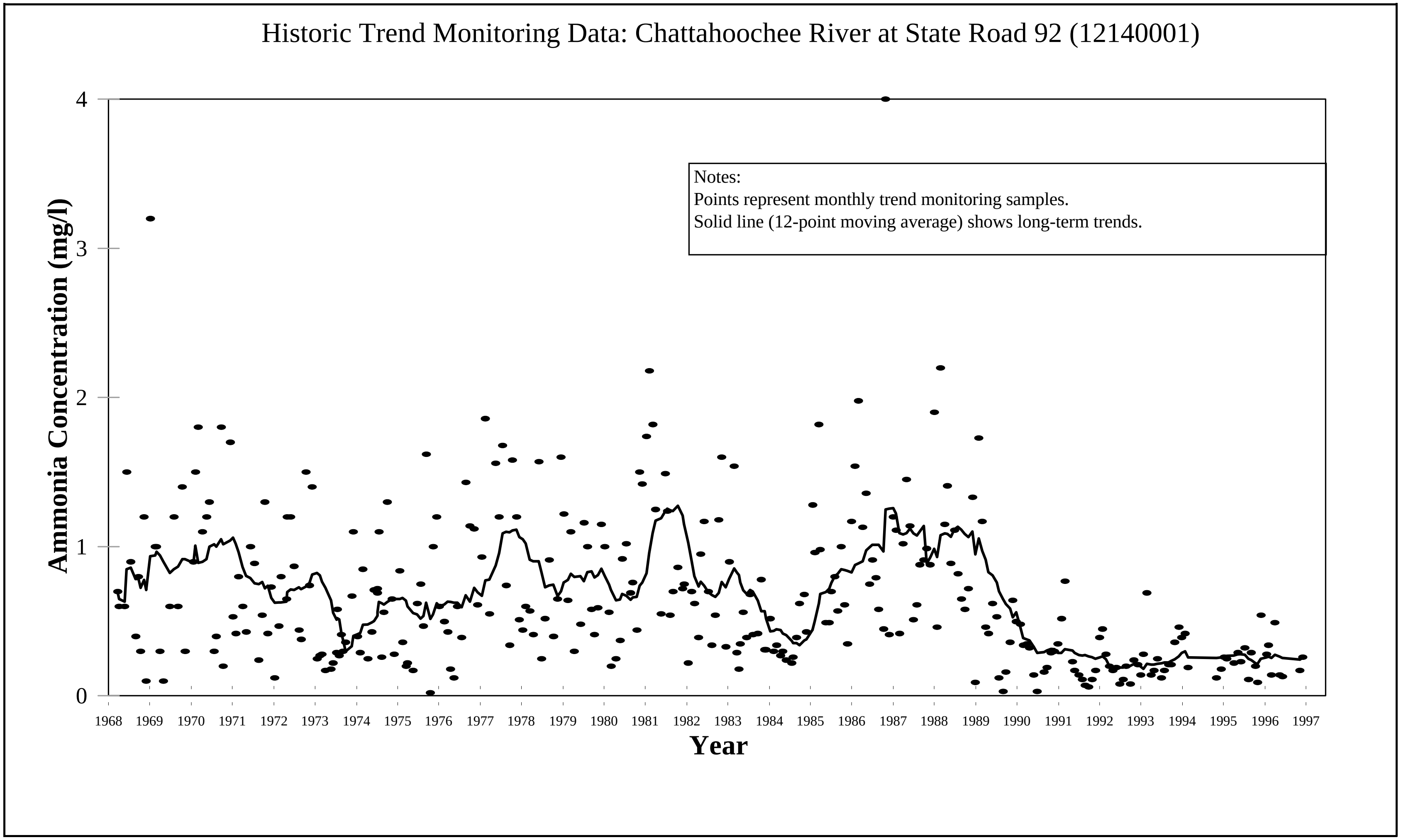


Figure 4-18. Ammonia Concentration (as N), Chattahoochee River at Hwy. 92 below Atlanta

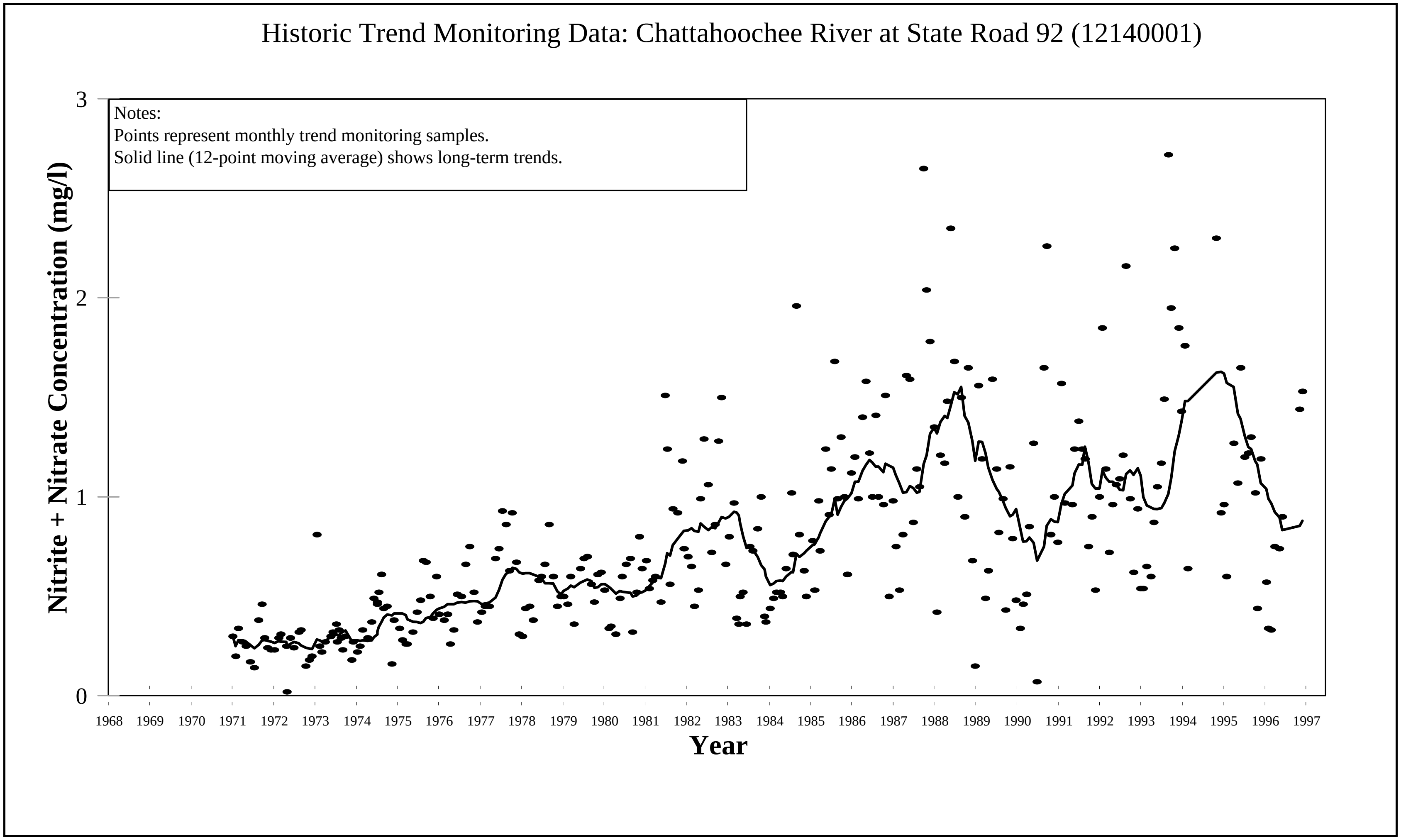


Figure 4-19. Nitrite plus Nitrate Concentration (as N), Chattahoochee River at Hwy. 92 below Atlanta

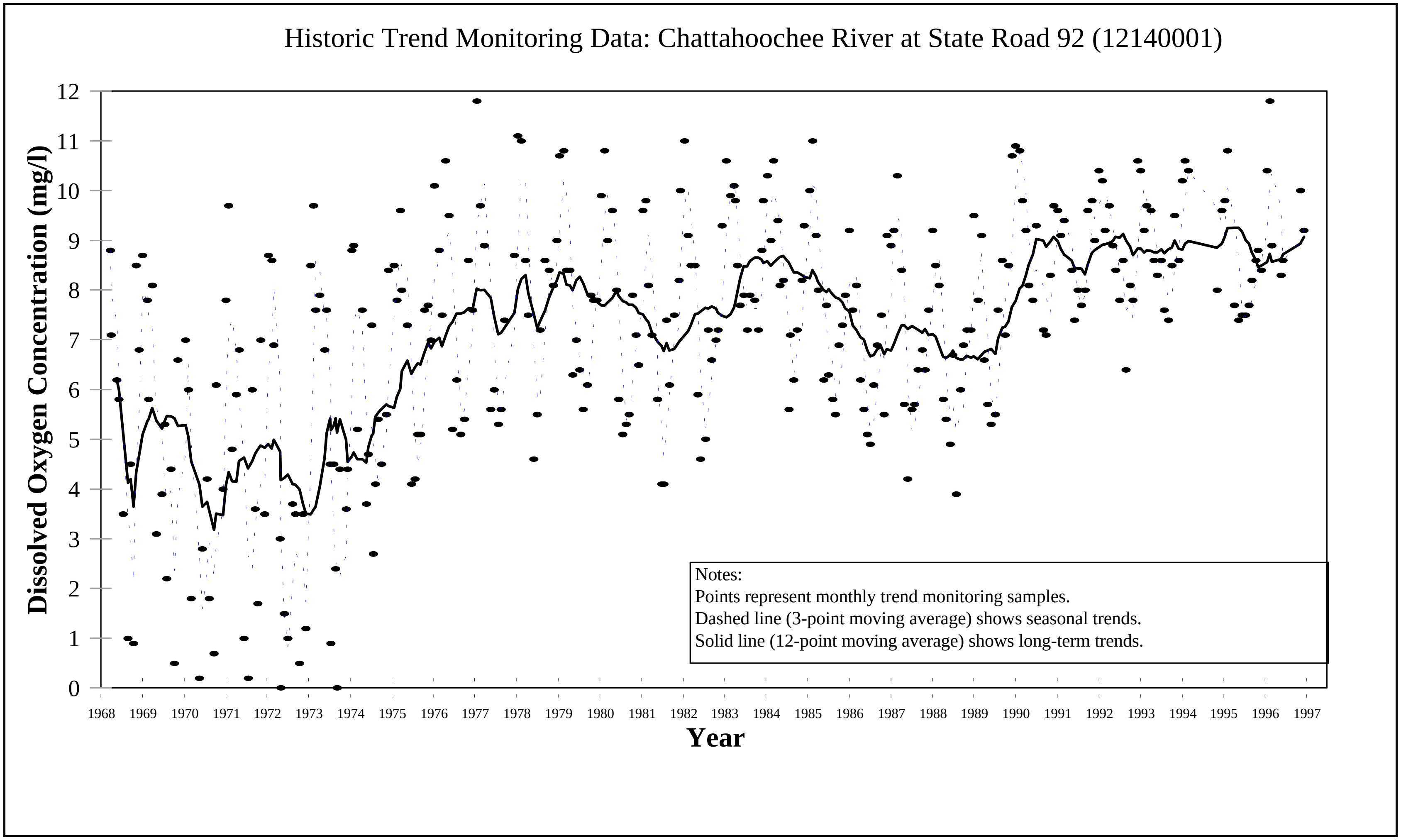


Figure 4-20. Dissolved Oxygen Concentration, Chattahoochee River at Hwy. 92 below Atlanta

dramatic improvement occurred between 1973 and 1975, associated with upgrades of the Atlanta and Cobb Co. wastewater treatment plants.

The most significant oxygen depletion problems currently observed in the Chattahoochee River are associated with bottom water discharges from Lake Lanier during late summer and fall (August to November). This water naturally reoxygenates during turbulent flow in the river; however, dissolved oxygen concentrations below the water quality standard extend for several miles downstream in summer months during periods of power generation. An important goal of the ongoing Chattahoochee River Modeling Project (CRMP) is to provide a time-variable modeling system which can support regulatory decision making for dissolved oxygen and other issues on the reach of the Chattahoochee between Buford Dam and Franklin, Georgia.

Dissolved oxygen violations are also associated with hydropower releases of bottom water from West Point Dam and W.F. George Lock and Dam.

4.2.3 Metals

Violations of water quality standards for metals (e.g., lead, copper, zinc) were the second most commonly listed causes of non-support of designated uses in the 1994-95 water quality assessment, after fecal coliforms. In most cases, these metals are attributed to nonpoint urban runoff and stormwater. Point sources also contribute metals loads; however, major point sources of metals in the Chattahoochee basin (wastewater treatment plants and certain industrial discharges) have been brought into compliance with permit limits, leaving the more-difficult-to-control nonpoint sources as the primary cause of impairment.

It should be noted that sample data on metals in many streams is rather sparse, and there are concerns with quality of some of the older data. While urban runoff appears to be the primary source of loading of these stressors, loading rates have not been quantified and will require additional study.

Primarily within the Coastal Plain, mercury is a metal of concern which has led to several fish consumption guidelines. Ultimate sources of loading of this mercury may include urban runoff, atmospheric deposition, and natural background.

4.2.4 Fecal Coliform Bacteria

Violations of the standard for fecal coliform bacteria were the most commonly listed cause of non-support of designated uses in the 1994-95 water quality assessment. Fecal coliform bacteria are monitored as an indicator of fecal contamination and the possible presence of human bacterial and protozoan pathogens in water. Fecal coliform bacteria may arise from many of the different point and nonpoint sources discussed in Section 4.1. Human waste is of greatest concern as a potential source of bacteria and other pathogens. One primary function of wastewater treatment plants is to reduce this risk through disinfection. Observed violations of the fecal coliform standard below several wastewater treatment plants on the Chattahoochee River have generally been rapidly corrected in recent years. Combined sewer overflows, which may discharge dilute untreated sewage directly to streams during wet weather, have been a source of intermittent fecal coliform contamination in the Atlanta and Columbus areas, but are now being addressed through control strategies, as discussed in Section 4.1.1.2.

Figure 4-21 shows fecal coliform concentrations measured at the trend monitoring station in the Chattahoochee at State Road 92, downstream of Atlanta. Note that the left-hand axis uses a

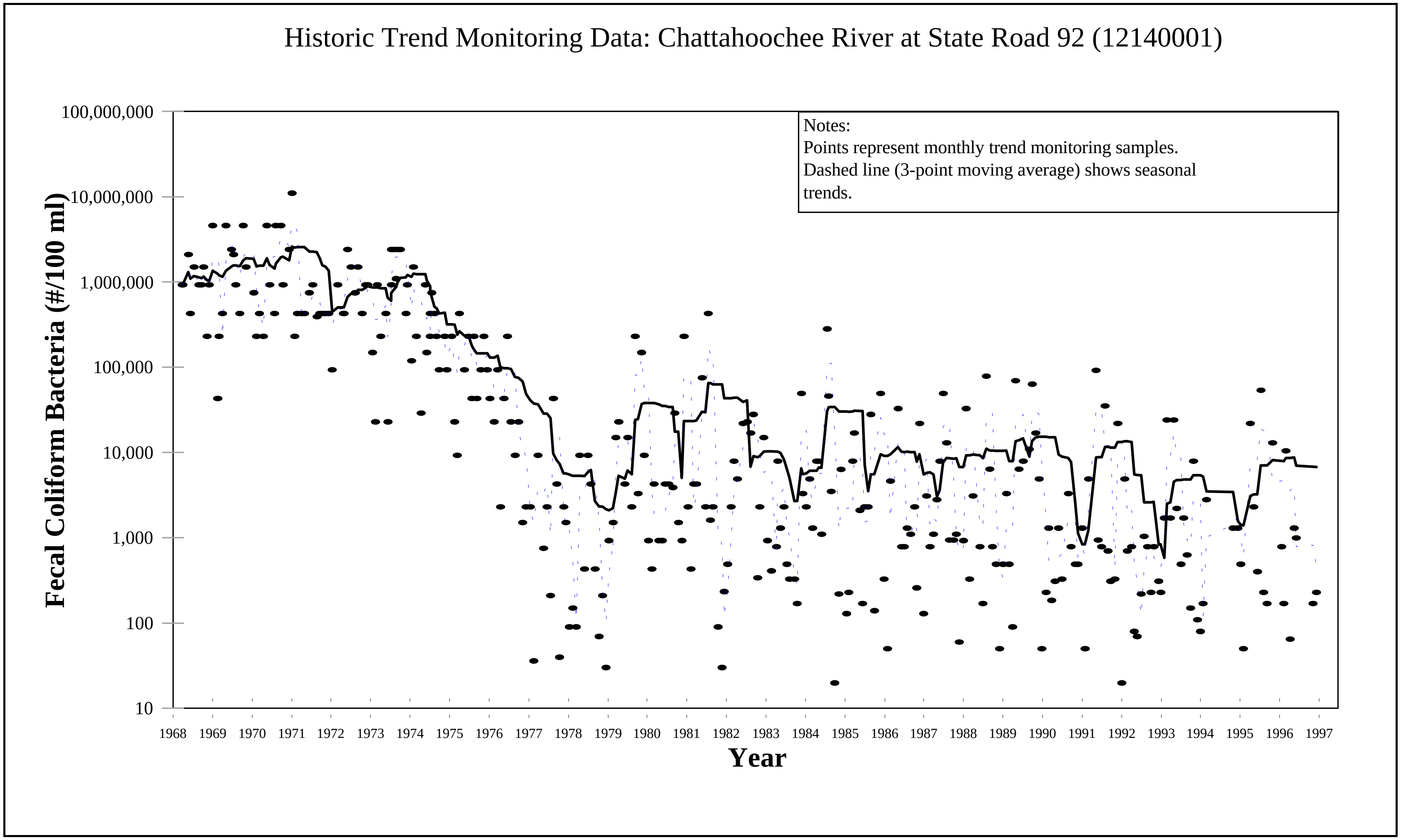


Figure 4-21. Fecal Coliform Bacteria Concentration, Chattahoochee River at Hwy. 92 below Atlanta

logarithmic scale. Prior to 1976, fecal coliform concentrations were frequently greater than 100,000 per 100 ml, representing significant water quality degradation and a potential threat to human health (the current standard for fecal coliform is a 30-day geometric mean of 200 per 100 ml in recreational waters; in other waters the standard is a 30-day geometric mean of 200 per 100 ml during May through October, and 1000 per 100 ml in November through April). Significant improvement (99.9% reduction) in fecal coliform concentrations occurred during the 1970's as secondary treatment of wastewater was implemented. During 1995-97, median fecal coliform concentration was 490 per 100 ml at this station, although individual concentrations as high as 54,000 per 100 ml were noted. Similar improvements can be seen in the time series of fecal coliform concentrations in the Chattahoochee at Omaha, downstream of Columbus (Figure 4-22). Here, the median concentration during 1995-97 was 330 per 100 ml.

As point sources have been brought under control, nonpoint sources have become increasingly important as potential sources of fecal coliform bacteria. Nonpoint sources may include

- Agricultural nonpoint sources, including concentrated animal operations and spreading and/or disposal of animal wastes may introduce fecal contamination into waterbodies. Spreading of wastes from poultry operations in HUC 03130001 may be of particular concern.
- Runoff from urban areas transports surface dirt and litter which may include both human and animal fecal matter, as well as a fecal component derived from sanitary sewer overflows. Urban nonpoint sources of pollution appear to present the greatest problem for fecal coliform loading in the metropolitan Atlanta area, where most smaller streams show violations of the fecal coliform standard. Significant, but lesser problems with fecal coliform loading in urban runoff have also been noted in Columbus, Gainesville, LaGrange, and other smaller urban areas.
- Urban and rural input from failed or ponding septic systems may also be a source of fecal coliform bacteria.

4.2.5 Synthetic Organic Chemicals

Synthetic organic chemicals (SOCs) include pesticides, herbicides, and other man-made toxic chemicals. SOCs may be discharged to waterbodies in a variety of ways, including:

- Industrial point source discharges;
- Wastewater treatment plant point source discharges, which often include industrial effluent as well as SOCs from household disposal of products such as cleaning agents, insecticides, etc.;
- Nonpoint runoff from agricultural and silvicultural land with pesticide and herbicide applications;
- Nonpoint runoff from urban areas, which may load a variety of SOCs, including horticultural chemicals, termiticides, etc.;
- Illegal disposal and dumping of wastes.

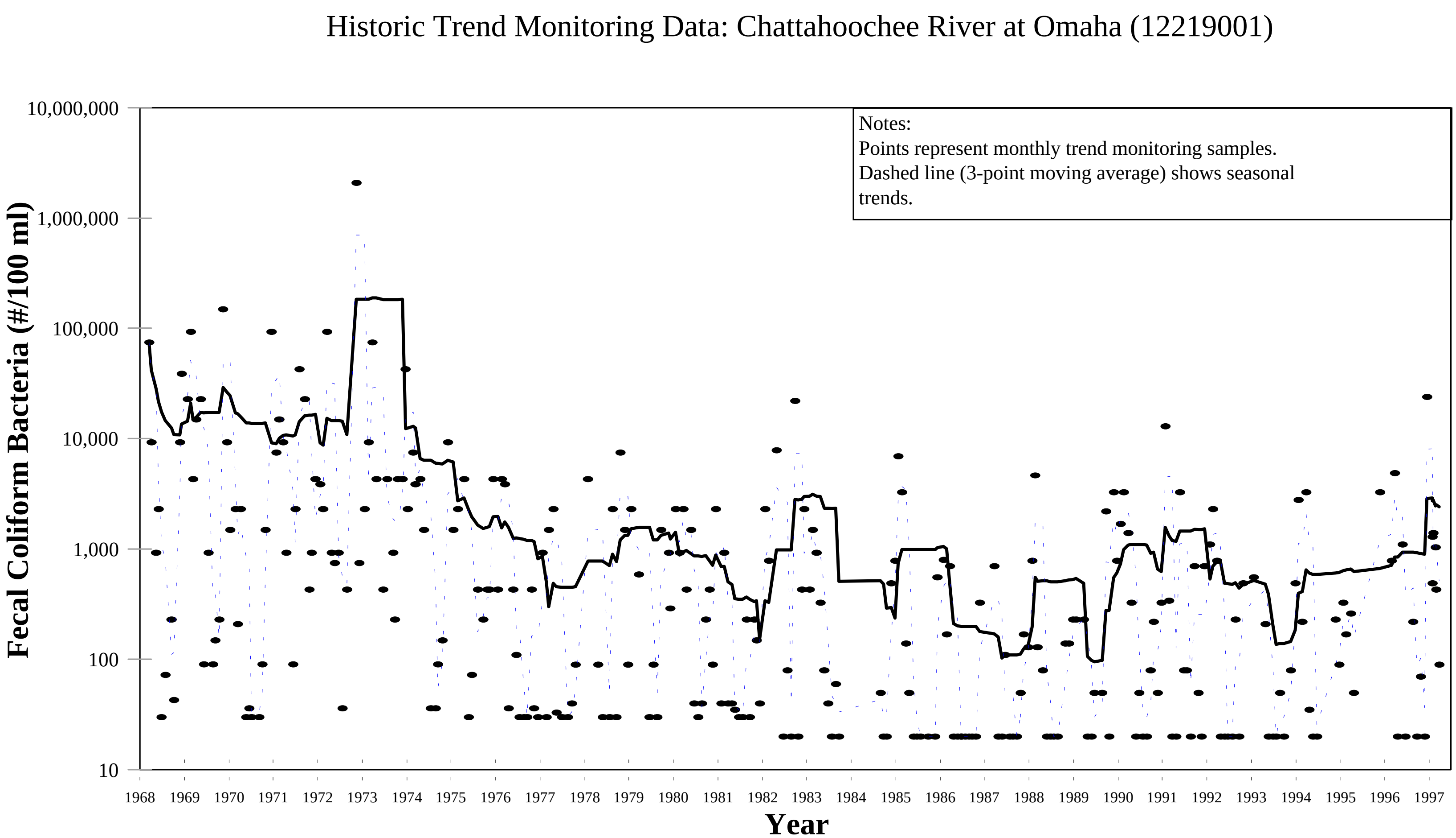


Figure 4-22. Fecal Coliform Bacteria Concentration, Chattahoochee River at Omaha above Lake W. F. George

To date, synthetic organic chemicals have not been detected in the surface waters of the Chattahoochee River Basin in problem concentrations. It should be noted, however, that the majority of monitoring has been targeted to waters below point sources where potential problems were suspected. Agricultural sources were potentially important in the past, particularly from cotton production in the Coastal Plain, but risk of excess loading has apparently greatly declined with a switch to less persistent pesticides. Recent research by USGS (Stell et al., 1995; Hippe et al., 1994) suggests pesticide/herbicide loading in urban runoff and stormwater may be of greater concern than agricultural loading, particularly in streams of the metropolitan Atlanta area.

Certain SOCs, discharged to the watershed in past decades, continue to be of concern today. In particular, PCBs and chlordane (both now banned) have resulted in fish consumption guidelines throughout the Chattahoochee mainstem from Buford Dam to Lake Seminole. These compounds, which are highly bioaccumulative, apparently enter the food chain from contaminated sediments. Urban runoff and stormwater may also play a role in continued loading of these chemicals.

4.2.6 Flow and Temperature Modification

Stress from flow modification is primarily associated with peaking hydropower operation of dams on the Chattahoochee River, and increased stormflow in smaller streams associated with development and increased impervious area. Most notably, hydropeaking operation of Buford Dam at Lake Lanier results in pulsing of flow and summer/fall releases of cool bottom water which tends to be depleted in dissolved oxygen.

The reach of the Chattahoochee River between Buford Dam and Atlanta is able to support a coldwater fishery because of releases of cold bottom waters from Lake Lanier, while natural climate conditions would not provide summer water temperatures suitable to a coldwater trout fishery. Accordingly, this stretch of the river is sensitive to increased temperature. Summer stormwater runoff from impervious urban areas around Atlanta has the potential to increase water temperatures in the river, and can be a source of stress to the trout population.

4.2.7 Sediment

Erosion and discharge of sediment can have a number of adverse impacts on water quality. First, sediment may carry attached nutrients, pesticides and metals into streams. Second, sediment is itself a stressor. Excess sediment loads can alter habitat, destroy fish spawning substrate, and choke aquatic life, while high turbidity also impairs recreational and drinking water uses. Sediment loading is of concern throughout the basin, but is of greatest concern in developing areas of metropolitan Atlanta and in the steep headwaters area above Lake Lanier. Important sources of sediment load include: construction; unpaved rural roads; streambank erosion associated with peak flows from increased impervious area and hydropower operations; dredging; agriculture; and forestry.

Within the Chattahoochee basin, the importance of agriculture as a source of sediment load relative to other sources is diminished because the percent of land in crops is relatively low, except within the flat Coastal Plan areas of the basin.

4.2.8 Habitat Degradation and Loss

In many parts of the Chattahoochee basin, support for native aquatic life is threatened by degradation of aquatic habitat. Habitat degradation is closely tied to sediment loading, and excess sediment is the main threat to habitat in rural areas with extensive land disturbing activities, as well as in urban areas where increased flow peaks and construction can choke and alter stream bottom substrates. A second important type of habitat degradation in the Chattahoochee is loss of riparian tree cover, which can lead to increased water temperatures.

Habitat degradation appears to be of greatest concern within the headwaters trout streams north of Lake Lanier, and in urban areas, especially the metropolitan Atlanta area.

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Section 5

Assessments

This section provides an evaluation of current conditions in the Chattahoochee River Basin, and includes assessment of both water quantity (Section 5.1) and water quality (Section 5.2) issues. The assessment results are combined with the evaluation of environmental stressors (Section 4) to produce a listing of Concerns and Priority Issues in Section 6.

5.1 Assessment of Water Quantity

Water quantity issues in the Chattahoochee River Basin are being addressed comprehensively as part of the ACT/ACF study. In that process an Interstate Compact is to be established for the purpose of administering a water allocation formula which will partition the flow of the Chattahoochee and Flint Rivers among Alabama, Florida, and Georgia. The following sections provide a summary of preliminary findings from this study.

5.1.1 Municipal and Industrial Water Uses

As noted in Section 3.2, Municipal and Industrial (M&I) demands in the Chattahoochee River Basin are expected to increase by about 6% between 1995 and 2005, virtually all from surface water sources. By the year 2050, M&I water use is expected to increase only another 16%, largely because industrial use will decrease substantially. Although there will undoubtedly be some problems in meeting these increased demands, given the high priority placed on meeting drinking water needs, meeting these demands should not exceed the availability of raw water sources, especially since approximately 80% of the M&I withdrawals are returned to the river.

Overall the surface water quality in the Chattahoochee River Basin is good for use as drinking water. However, surface water quality problems due to non-point source pollution such as agricultural and storm water runoff are concerns to municipalities which withdraw surface water from the Chattahoochee River and tributaries. The contaminant of most concern is high turbidity due to erosion and sediment runoff. Water high in turbidity can clog filters, interrupt the proper treatment of raw water, and increase the cost of the water to the consumers because more chemicals are needed to settle out the sediment. All public water systems in the state of Georgia that use surface water meet the federal Surface Water Treatment Rules for filtration and treatment.

Overall ground water quality is very good for use as drinking water from wells. Since most wells used in public water systems are constructed by licensed well drillers and draw from deeper aquifers, the number of contaminated wells is small. However, in the Chattahoochee Basin some public water system wells have been contaminated by local pollution sources such as leaky underground storage tanks, malfunctioning septic tank systems, and spills. Those wells that exceed the Maximum Contaminant Level (MCL) for a contaminant are either removed from service or added treatment to the system. Also, a few wells in the basin have been found to be under the direct influence of surface water due to the geology of the area in which the well is located. These wells are monitored and have additional treatment requirements.

5.1.2 Agriculture

The water demand for agricultural use in the Chattahoochee Basin is, and will remain for the foreseeable future, a small portion of the total demand. Whether taken from surface or ground water sources, there is no reason to believe that the supply will not be adequate, even during a drought year.

5.1.3 Recreation

In the Chattahoochee Basin the availability of water is most likely to have a significant effect on recreation through the way in which water levels are managed at Lake Lanier. Because of the significant recreational use of Lake Lanier, and the tremendous investment in homes and recreation activities around the lake, it is very important that water levels be kept as high as possible, especially in the spring, summer, and early fall. Water level management is as much a function of the way in which the reservoirs are operated as of water availability, however. Should the Corps of Engineers operate the dam in a manner which emphasizes power production and a conservative flood control philosophy, water levels will not be kept as high as would be the case if storage were to be maximized as a precaution against a drought. Under the Corps' conservative operational philosophy, when a drought occurs there will likely be a greater chance that water levels will drop below that which supports optimum recreation potential. However, there are significant issues related to flood protection which must be considered carefully before normal pool levels are raised. The ACT/ACF Study should address this issue as well as that of water flow allocation in the basins.

5.1.4 Hydropower

Hydropower production to meet peaking needs is dependent on timely release of water through the turbines in the major reservoirs. The continued release of sufficient quantities of water to meet the peaking demand during droughts will be dependent on the water allocation decisions made by the ACF Interstate Compact Commission, and also by decisions made within Georgia about in-state allocation of the available water supply. Given the priority for meeting drinking and agricultural water needs within Georgia, it is certainly possible that hydropower production could be curtailed at times when water availability is low.

5.1.5 Navigation

The Chattahoochee River is navigable upstream to Columbus. Limitations to navigation have historically been associated with the requirement for extensive channel maintenance in the Apalachicola River in Florida. The amount of channel maintenance in the Apalachicola and the amount (and timing) of water to be made available for navigation support will be a subject of the ACF Study and will be part of the considerations involved in establishing a water allocation formula. Late summer and fall are typically the seasons in which water availability is most limited. At these times the Corps is usually only able to provide sufficient water to support navigation during limited time periods (navigation windows). It is unlikely that navigable channel depths will be provided on a full time basis in the future; however, it is hoped that satisfactory navigation channel conditions can be provided in a predictable manner to support Georgia's shipping needs.

Table 5-1. Georgia Water Use Classifications and Instream Water Quality Standards for Each Use

	Bacteria (fecal coliform)		Dissolved Oxygen (other than trout streams)[1]		pH	Temperature (other than trout streams)[1]	
Use Classification	**30-Day Geometric Mean[2] (MPN/100 ml)**	**Maximum (MPN./100 ml)**	**Daily Average (mg/l)**	**Minimum (mg/l)**	**Std. Units**	**Maximum Rise (°F)**	**Maximum (°F)**
Drinking Water requiring treatment	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Recreation	200 (Freshwater) 100 Coastal)	--	5.0	4.0	6.0-8.5	5	90
Fishing Coastal Fishing[3]	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Wild River	No alteration of natural water quality						
Scenic River	No alteration of natural water quality						

1 Standards for Trout Streams for dissolved oxygen are an average of 6.0 mg/l and a minimum of 5.0 mg/l. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2°F is allowed in Secondary Trout Streams.

2 Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.

3 Standards are same as fishing with the exception of dissolved oxygen which is site specific.

5.1.6 Waste Assimilation Capacity

Sufficient flow for assimilation of treated wastewater in the Chattahoochee River is most critical in the reach between Atlanta, and West Point Lake. Criteria have been established for minimum stream flow for this purpose at Peachtree Creek. Georgia has obligations under the Clean Water Act to meet instream water quality standards, and the State places a high priority on this obligation (See Section 6.0). Only under extreme drought conditions, when sufficient water flow is not available after domestic water supply needs are met, would there be insufficient water to meet instream water quality standards.

5.2 Assessment of Water Quality

This assessment of water quality is generally consistent with Georgia's water quality assessments for CWA Section 305(b) reporting to EPA. It begins with a discussion of (1) water quality standards, (2) monitoring programs, and (3) data analyses to assess compliance with water quality standards and determine use support. Following this introductory material, detailed assessment results by sub-basin are presented in Section 5.2.4.

5.2.1 Water Quality Standards

Assessment of water quality requires a baseline for comparison. A statewide baseline is provided by Georgia's water quality standards, which contain water use classifications, numeric standards for chemical concentrations, and narrative requirements for water quality.

Georgia's water use classifications and standards were first established by the Georgia Water Quality Control Board in 1966. The water use classification system was applied to interstate waters in 1972 by EPD. Table 5-1 provides a summary of water use classifications and basic water quality criteria for each water use. Georgia also has general narrative water quality standards, which apply to all waters. These narrative standards are summarized in Table 5-2.

Table 5-2. Georgia Narrative Water Quality Standards for All Waters

(Excerpt from Georgia Rules and Regulations for Water Quality Control Chapter 391-3-6-.03 - Water Use Classifications and Water Quality Standards)

(5) General Criteria for All Waters. The following criteria are deemed to be necessary and applicable to all waters of the State:

(a) All waters shall be free from materials associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits that become putrescent, unsightly or otherwise objectionable.

(b) All waters shall be free from oil, scum and floating debris associated with municipal or domestic sewage, industrial waste or other discharges in amounts sufficient to be unsightly or to interfere with legitimate water uses.

(c) All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.

(d) All waters shall be free from toxic, corrosive, acidic and caustic substances discharged from municipalities, industries or other sources, such as nonpoint sources, in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

(e) All waters shall be free from turbidity which results in a substantial visual contrast in a water body due to man-made activity. The upstream appearance of a body of water shall be observed at a point immediately upstream of a turbidity-causing man-made activity. The upstream appearance shall be compared to a point which is located sufficiently downstream from the activity so as to provide an appropriate mixing zone. For land disturbing activities, proper design, installation and maintenance of best management practices and compliance with issued permits shall constitute compliance with [this] Paragraph...

In addition to the basic water quality standards shown above, Congress made changes in the Clean Water Act in 1987 which required each State to adopt numeric limits for toxic substances for the protection of aquatic life and human health. In order to comply with these requirements, in 1989 the Board of Natural Resources adopted 31 numeric standards for protection of aquatic life and 90 numeric standards for the protection of human health. Appendix B provides a complete list of the toxic substance standards that apply to all waters in Georgia. Georgia has adopted all numeric standards for toxic substances promulgated by the USEPA.Georgia is also developing site-specific standards for major lakes where control of nutrient loading is required to prevent problems associated with eutrophication. In September 1995, the Board of Natural Resources adopted lake standards for West Point Lake. Standards were adopted for chlorophyll *a*, pH, total nitrogen, phosphorus, fecal coliform bacteria, dissolved oxygen, and temperature. Site-specific standards have also been adopted for Lake Walter F. George. The adopted standards for West Point Lake and Lake Walter F. George are presented in Table 5-3.

5.2.2 Surface Water Quality Monitoring

EPD monitoring program integrates physical, chemical, and biological monitoring to provide information for water quality and use attainment assessments and for basin planning. EPD monitors the surface waters of the state to collect baseline and trend data, to document existing conditions, study impacts of specific discharges, determine improvements resulting from upgraded water pollution control plants, support enforcement actions, establish wasteload allocations for new and existing facilities, verify water pollution control plant compliance, document water use impairment and reasons for problems causing less than full support of designated water uses, and develop TMDLs. Trend monitoring, intensive surveys, lake, coastal,

Table 5-3. Water Quality Standards for West Point Lake and Lake Walter F. George

(16) Specific Criteria for Lakes and Major Lake Tributaries. In addition to the general criteria, the following lake specific criteria are deemed necessary and shall be required for the specific water usage as shown:

(a) West Point Lake: Those waters impounded by West Point Dam and downstream of US 27 at Franklin.
- (i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 27 μg/l at the LaGrange Water Intake.
- (ii) pH: within the range of 6.0-9.5.
- (iii) Total Nitrogen: Not to exceed 4.0 mg/l as Nitrogen in the photic zone.
- (iv) Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre foot of lake volume per year.
- (v) Fecal Coliform Bacteria:
  1. US 27 at Franklin to New River: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c).
  2. New River to West Point Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b).
- (vi) Dissolved Oxygen: A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(f).
- (vii) Temperature: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature.
- (viii) Major Lake Tributaries: For the following tributaries, the annual total phosphorus loading to West Point Lake shall not exceed the following:
  1. Yellow Jacket Creek at Hammet Road: 11,000 pounds.
  2. New River at Hwy. 100: 14,000 pounds.
  3. Chattahoochee River at US 27: 1,400,000 pounds.

(b) Lake Walter F. George: Those waters impounded by Walter F. George Dam and upstream to Georgia Highway 39 near Omaha.
- (i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 18 µg/l at mid-river at U.S. Highway 82 or 15 µg/l at mid-river in the dam forebay.
- (ii) pH: Within the range of 6.0-9.5 standard units.
- (iii) Total Nitrogen: Not to exceed 3.0 mg/l as nitrogen in the photic zone.
- (iv) Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.
- (v) Fecal Coliform:
  1. Georgia Highway 39 to Cowikee Creek: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c)(iii).
  2. Cowikee Creek to Walter F. George Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(I).
- (vi) Dissolved Oxygen: A daily average of no less than 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(f).
- (vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(b)(iv).
- (viii) Major Lake Tributary: The annual total phosphorus loading to Lake Walter F. George, monitored at the Chattahoochee River at Georgia Highway 39, shall not exceed 2,000,000 pounds.

biological, fish tissue, and toxic substance monitoring, and facility compliance sampling are the major monitoring tools used by EPD. Each of these is briefly described in the following sections.

Trend Monitoring. Long term monitoring of streams at strategic locations throughout Georgia, trend or ambient monitoring, was initiated by EPD during the late 1960s. This work was and continues to be accomplished to a large extent through cooperative agreements with federal, state, and local agencies who collect samples from groups of stations at specific, fixed locations throughout the year. The cooperating agencies conduct certain tests in the field and send stream samples to EPD for additional laboratory analyses. Although there have been a number of changes over the years, routine chemical trend monitoring is still accomplished through similar cooperative agreements.

Today EPD contracts with the United States Geological Survey (USGS) for the majority of the trend sampling work, and with the Columbus Water Works for samples on the Chattahoochee below Columbus. In addition to monthly stream sampling, a portion of the work with the USGS involves continuous monitoring at several locations across the State. An automatic monitor which continuously records dissolved oxygen, temperature, pH and conductivity data is located on the Chattahoochee River downstream of Atlanta.

In addition to work done by cooperative agreements, EPD associates collect samples monthly from locations on the Chattahoochee River between Buford Dam to downstream of Atlanta at Georgia Highway 92. EPD associates also collect water and sediment samples for toxic substance analyses, and macroinvertebrate samples to characterize the biological community at selected locations as a part of the trend monitoring effort. The trend monitoring network in place in the Chattahoochee in 1994 is shown in Figure 5-1.

In 1995, EPD adopted and implemented significant changes to the strategy for trend monitoring in Georgia. The changes were implemented to support the River Basin Management Planning program. The number of fixed stations statewide was reduced in order to focus resources for sampling and analysis in a particular group of basins in any one year in accordance with the basin planning schedule.

Figure 5-2 shows the redirected trend monitoring network for 1995. The focus for trend monitoring was in the Chattahoochee and Flint River basins. Statewide trend monitoring was continued at the thirty seven core station locations statewide, in the Savannah Harbor, and at all continuous monitoring locations. The remainder of the trend monitoring resources were devoted to the Chattahoochee and Flint River Basins. In addition to chemical sampling, new work on macroinvertebrate sampling was done as a part of the Chattahoochee/Flint River Basin monitoring work. As a result, more sampling was conducted along the mainstem and in the smaller tributaries of the two river basins. Increasing the resolution of the water quality monitoring improves the opportunity to identify impaired waters, as well as the causes of impairment.

Intensive Surveys. Intensive surveys complement long term fixed station monitoring as these studies involve intensive monitoring of a particular issue or problem over a shorter period of time. Several basic types of intensive surveys are conducted including model calibration surveys and impact studies. The purpose of a model calibration survey is to collect data to calibrate a mathematical water quality model. Models are used for wasteload allocations and/or TMDLs and as tools for use in making regulatory decisions. Impact studies are conducted where information on the cause and effect relationships between pollutant sources and receiving waters is needed. In many cases biological information is collected along with chemical data for use in assessing environmental impacts.

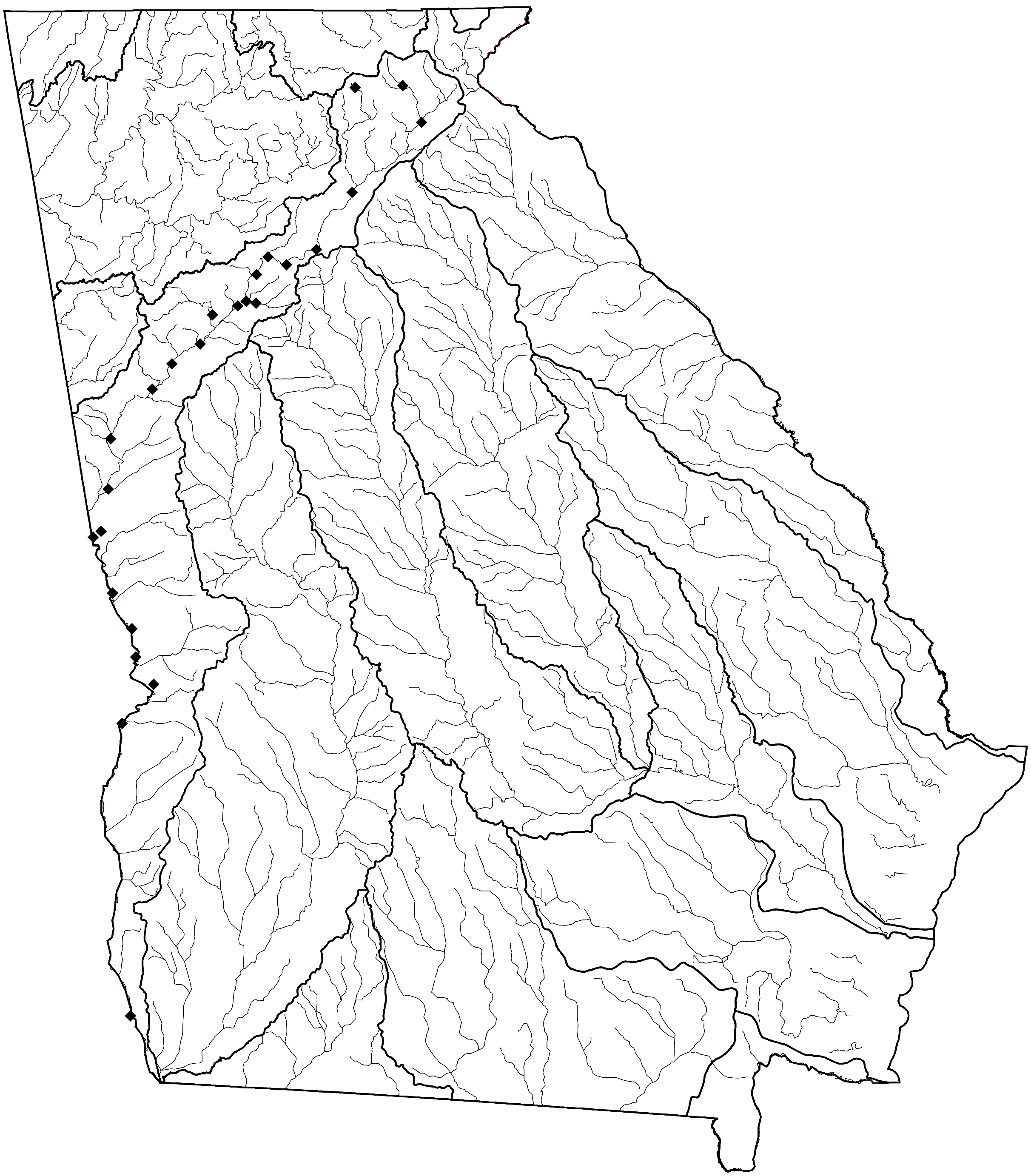

Figure 5-1. Chattahoochee River Basin Trend Monitoring Station Network, 1994

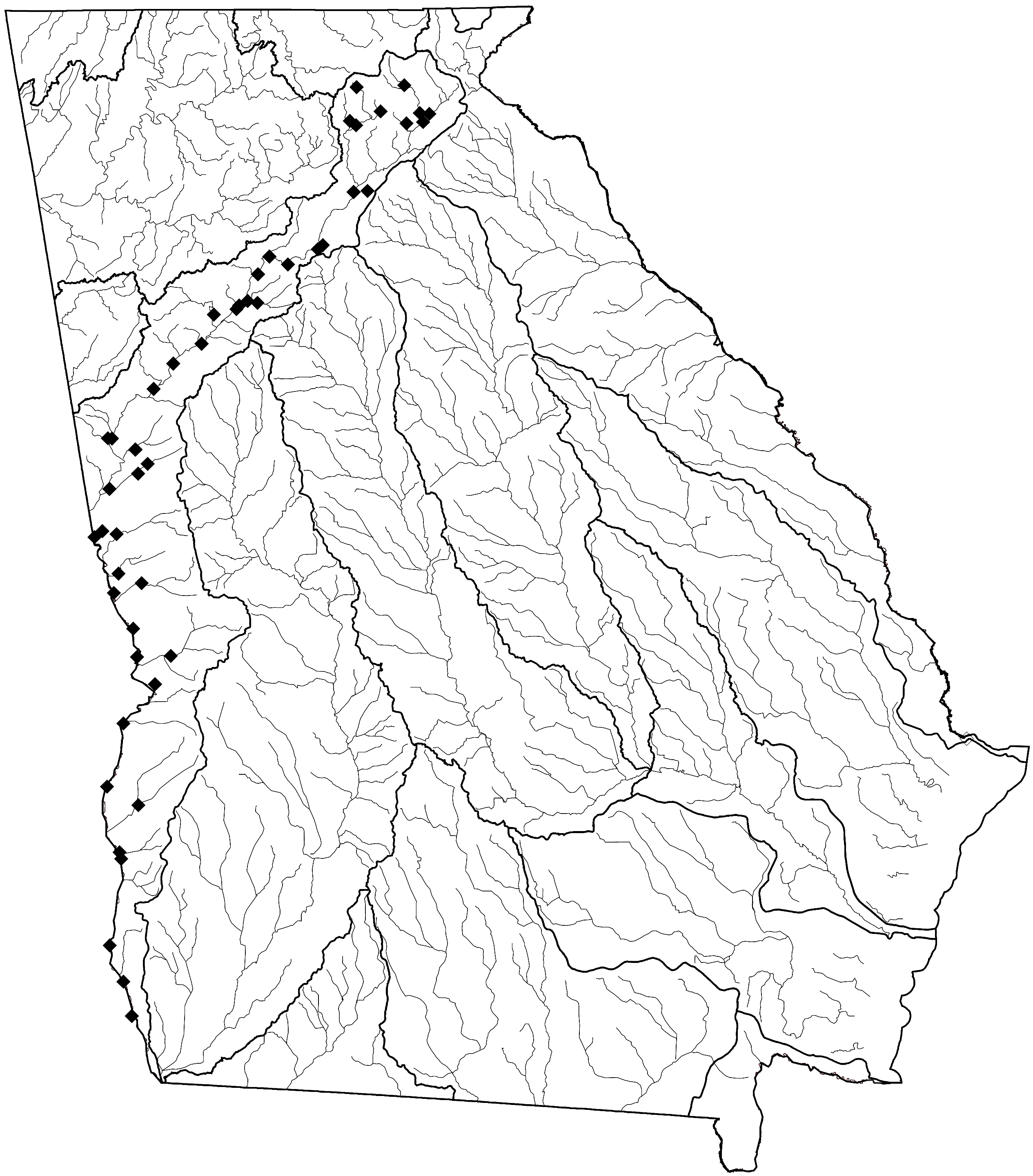

Figure 5-2. Chattahoochee River Basin Trend Monitoring Network Station Locations, 1995

In 1994-1995 intensive survey resources were focused on model calibration studies for the Chattahoochee River Modeling Project (CRMP). The CRMP will provide a time-variable hydrodynamic and water quality model for the main stem of the Chattahoochee River from Buford Dam to the headwaters of West Point Lake at Franklin, Georgia. The model will be a general-purpose model, capable of supporting regulatory decision making for a variety of water resource and water quality management issues into the 21st century. The study area is shown in Figure 5-3.

The CRMP project is being coordinated in three phases. Phase I focused on project planning and implementation and covered the period from January 1993 to May 1994. Phase II included field data collection and involved work performed during 1993-1996. Phase III comprises all model development activities including software development and testing, data handling and processing, main stem model calibration and verification, critical conditions assessment , and model preparation for critical period decision making. Phase III began in late 1994, continues to present, and should be essentially complete in 1998.

A companion effort, called the Chattahoochee Stormwater Project, began in April 1994 to develop lumped stormwater management models (SWMM models) for forty-seven tributary watersheds (Figure 5-3) in the study area. These stormwater models will be used to estimate wet weather loadings to the river during mainstem model calibration and validation. These models will also be used in the future to estimate stormwater impacts on the river during the analysis of specific issues that require regulatory decisions. Results from the Stormwater Project are anticipated during 1997, in time to support model calibration and critical period model development.

Phase I, project planning and implementation was completed in May 1994. The Phase I work was summarized in two reports, *Phase I Final Report, Issue Analysis and Model Selection, May 1994*, and *Field Study Plan, Part I: Purposes and Guiding Principles, February, 1994.* The Phase I report summarized the work done through public participation to identify the major issues to be addressed by the model over the next two decades and the work done to select the model to be used to address the priority issues. The field study plan report summarized the monitoring efforts necessary to collect data for model calibration and verification.

The field work involved multiple intensive survey efforts carried out over six month periods May-October, in 1994 and 1995 and continued in 1996 on a smaller scale. The field work was divided into modules and carried out as individual intensive studies. Modules were established for tributary sampling, centerline river sampling, continuous monitoring, photosynthesis-respiration measurements, time series BOD sampling, water pollution control plant sampling, Chattahoochee River/West Point Lake transition sampling, flow monitoring, temperature monitoring and bottom characterization. For the mainstem river and tributary sampling sites more than 3000 samples have been collected and analyzed in EPD laboratories.

This project has been conducted in partnership, both technically and financially, with other water resource agencies. Partners include the USEPA, the USGS, the local governments in the Atlanta Regional Commission, the National Park Service, the Corps of Engineers, the Waterways Experiment Station, Georgia Power Company, local government water pollution control plants, drinking water and stormwater utility personnel, as well as the multiple agency, environmental group, and individual input that was received during the issue identification work in Phase I of the project.

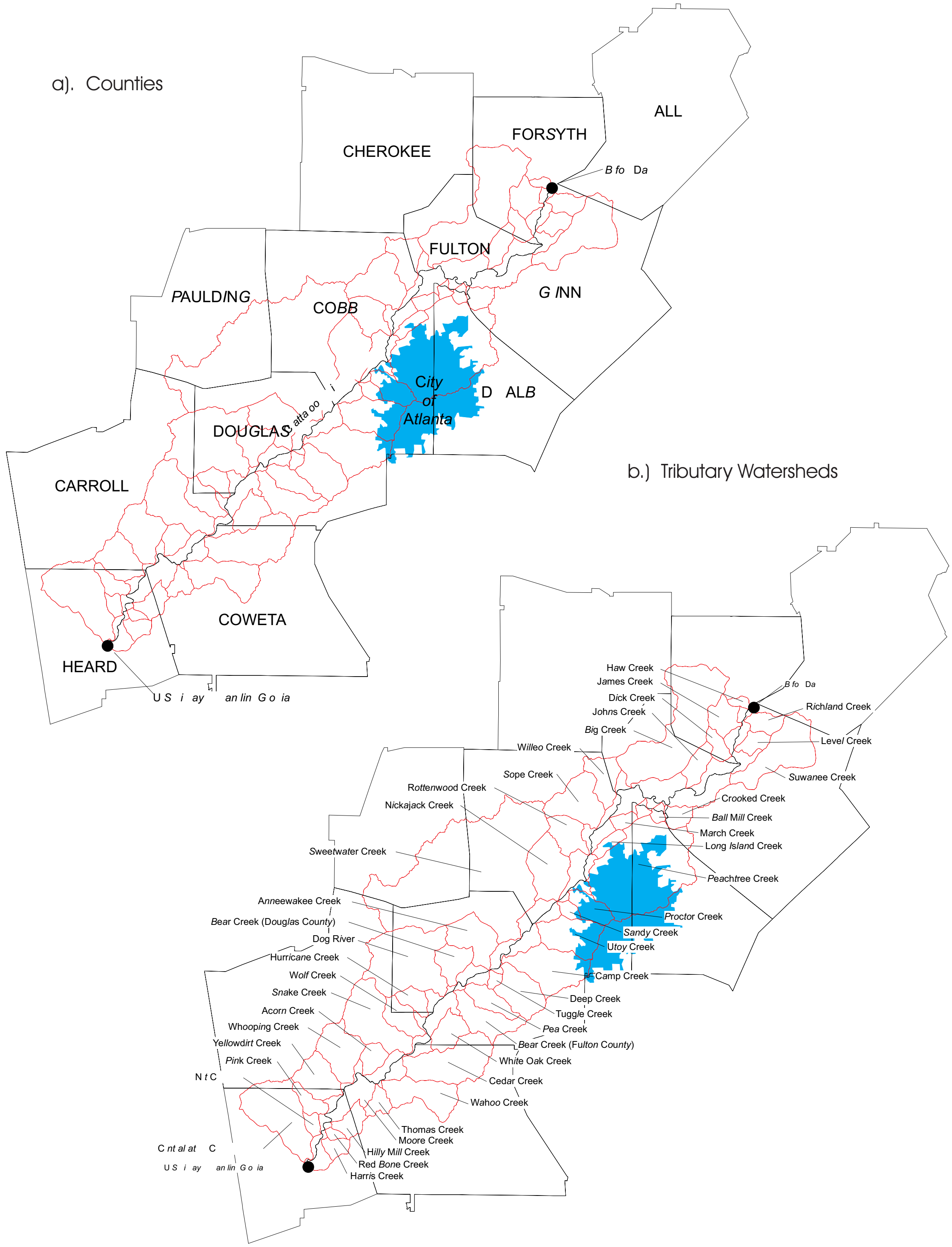

Figure 5-3. The CRMP Study Area

Another important recent special monitoring project was the West Point Lake Study. This work continued the project initiated in the mid-1980s, and continued in the early 1990s as a part of a joint Georgia-Alabama Clean Lakes Phase I Diagnostic-Feasibility Study, to assess water quality conditions in West Point Lake. The project involved water quality sampling and *in situ* data collection from a number of lake stations on a monthly basis during the algal growing season from May-October, 1995. In addition, in 1996 and 1997 EPD associates conducted sampling in West Point Lake and tributaries to provide data for calibration of a mathematical model of the lake. The modeling work will provide an additional tool for assessing conditions in the lake.

Lake Monitoring. EPD has maintained monitoring programs for Georgia's public access lakes for many years. In the late 1960's, lake water quality studies were conducted on Lake Lanier. Also at that time a comprehensive statewide study was conducted to assess fecal coliform levels at public beaches on major lakes in Georgia as the basis for water use classifications and establishment of water quality standards for recreational waters. In 1972, EPD staff participated in the USEPA National Eutrophication Survey which included fourteen lakes in Georgia. A post-impoundment study was conducted for West Point Lake in 1974. Additional lake monitoring continued through the 1970s. The focus of these studies was primarily problem/solution oriented and served as the basis for regulatory decisions. Georgia's water quality monitoring network has collected long term data from sites in four major lakes of which three, Lake Lanier, West Point Lake, and Lake Harding, are in the Chattahoochee basin.

In 1980-1981, EPD conducted a statewide survey of public access freshwater lakes. The study was funded in part by USEPA Clean Lakes Program funds. The survey objectives were to identify freshwater lakes with public access, assess each lake's trophic condition, and develop a priority listing of lakes as to need for restoration and/or protection. In the course of the survey, data and information were collected on 175 identified lakes in 340 sampling trips. The data collected included depth profiles for dissolved oxygen, temperature, pH, and specific conductance, Secchi disk transparency, and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity. The three measures of Carlson's Trophic State Index were combined into a single trophic state index (TTSI) and used with other field data and observations to assess the trophic condition of each lake. Higher values of the TTSI represent more eutrophic, less desirable conditions. Monitoring efforts have continued since the 1980-1981 Lake Classification Survey with a focus on major lakes (those with a surface area greater than 500 acres), and the TTSI has continued to be employed as a tool to mark trophic state trends. The major lakes in the Chattahoochee basin are listed in Table 5-4 and are ranked according to the TTSI for the period 1984-1993. Greater study emphasis has been placed on those lakes with consistently higher rankings. The major lakes monitoring project was suspended in 1994 due to a lack of field and laboratory resources resulting from the focus on the CRMP work. The work on major lakes in the future will be a part of the River Basin Management Planning process.

Fish Tissue Monitoring. The DNR conducts fish tissue monitoring for toxic chemicals and issues fish consumption guidelines as needed to protect human health. It is not be possible for the DNR to sample fish from every stream and lake in the state. However, high priority has been placed on the 26 major reservoirs which make up more than 90% of the total lake acreage. These lakes will continue to be sampled as part of the River Basin Management Planning five year rotating schedule to track trends in fish contaminant levels. The DNR has also made

Table 5-4. Major Lakes in the Chattahoochee Basin Ranked by Sum of Trophic State Index Values, 1980-1993

1984		1985		1986		1987		1988	
Harding	181	Seminole	184	Harding	177	Harding	184	Harding	178
Seminole	179	Harding	171	Oliver	176	Oliver	177	Seminole	174
Oliver	170	WF George	161	Seminole	175	Seminole	<160	Oliver	171
WF George	168	Oliver	161	WF George	162	West Point	<156	West Point	169
West Point	156	West Point	157	West Point	160	WF George	<151	WF George	168
Lanier	138	Lanier	123	Lanier	128	Lanier	<123	Lanier	<132
range for state:	120-205	*range for state:*	116-188	*range for state:*	114-177	*range for state:*	<108-184	*range for state:*	111-178

1989		1990		1991		1992		1993	
WF George	192	Oliver	177	Harding	185	Seminole	183	Seminole	175
Harding	191	Harding	174	Seminole	181	WF George	181	Harding	170
Oliver	170	Seminole	154	WF George	172	Oliver	168	Oliver	170
Seminole	174	WF George	145	West Point	171	Harding	166	WF George	169
West Point	164	West Point	141	Oliver	157	West Point	163	West Point	163
Lanier	<128	Lanier	126	Lanier	121	Lanier	138	Lanier	122
range for state:	123-209	*range for state:*	118-182	*range for state:*	121-193	*range for state:*	131-194	*range for state:*	122-195

Note: Higher values represent more eutrophic conditions.

sampling fish in rivers and streams down-stream of urbanand/or industrial areas a high priority. In addition, DNR will focus attention on areas which are frequented by a large number of anglers.

The program includes testing of fish tissue samples for the substances listed in Table 5-5. Of the 43 constituents tested, only PCBs, chlordane, and mercury have been found in fish at concentrations which could create risk to human health from fish consumption.

The test results have been used to develop consumption guidelines which are updated annually and provided to fishermen when they purchase fishing licenses. This program will continue and will be coordinated as a part of the River Basin Management Planning process in the future.

Table 5-5. Parameters for Fish Tissue Testing

Antimony	a-BHC	Heptachlor
Arsenic	b-BHC	Heptachlor Epoxide
Beryllium	d-BHC	Toxaphene
Cadmium	g-BHC (Lindane)	PCB-1016
Chromium, Total	Chlordane	PCB-1221
Copper	4,4-DDD	PCB-1232
Lead	4,4-DDE	PCB-1242
Mercury	4,4-DDT	PCB-1248
Nickel	Dieldrin	PCB-1254
Selenium	Endosulfan I	PCB-1260
Silver	Endosulfan II	Methoxychlor
Thallium	Endosulfan Sulfate	HCB
Zinc	Endrin	Mirex
Aldrin	Endrin Aldehyde	Pentachloroanisole
		Chlorpyrifos

Toxic Substance Stream Monitoring. EPD has focused resources on the management and control of toxic substances in the State's waters for many years. Toxic substance analyses have been conducted on samples from selected trend monitoring stations since 1973. Wherever discharges were found to have toxic impacts or to include toxic pollutants, EPD has incorporated specific limitations on toxic pollutants in NPDES discharge permits.

In 1983 EPD intensified toxic substance stream monitoring efforts. This expanded toxic substance stream monitoring project includes facility effluent, stream, sediment, and fish sampling at specific sites downstream of selected industrial and municipal discharges. From 1983 through 1991, ten to twenty sites per year were sampled as part of this project. During the 1994-1995 period, this effort was reduced significantly due to use of limited laboratory resources for different types of analysis. Future work will be conducted as a part of the River Basin Management Planning process.

Facility Compliance Sampling. In addition to surface water quality monitoring, EPD conducts evaluations and compliance sampling inspections of municipal and industrial water pollution control plants. Compliance sampling inspections include the collection of 24-hour composite samples, and an evaluation of the permittee sampling and flow monitoring requirements.

In excess of 350 sampling inspections were conducted by EPD staff statewide in 1994-1995. The results were used, in part, to verify the validity of permittee self-monitoring data and as supporting evidence, as applicable, in enforcement actions. Also, sampling inspections can lead to identification of illegal discharges. In 1995 this work was focused in the Chattahoochee and Flint River basins in support of the River Basin Management Planning process.

Aquatic Toxicity Testing. In 1982 EPD incorporated aquatic toxicity testing in selected industrial NPDES permits. In January 1995, EPD issued approved NPDES Reasonable Potential Procedures which further delineated required conditions for conducting whole effluent toxicity (WET) testing for municipal and industrial discharges. Today, toxicity testing is addressed in all municipal and industrial NPDES permits.

EPD has conducted aquatic toxicity tests on effluents and surface waters since 1985. In 1988, EPD constructed laboratory facilities to support chronic and acute testing capabilities. All toxicity testing is conducted in accordance with appropriate USEPA methods. Over the 1994-1995 period, EPD conducted 106 chronic tests and 19 acute tests on effluents or surface waters. In 1995, priority was given to testing of facility effluents in the Chattahoochee and Flint River basins in accordance with the River Basin Management Planning approach. Test results are used to manage and control the discharge of toxic substances in toxic amounts to the waters of the State. Toxicity testing at the EPD lab will be phased out in July 1997.

5.2.3 Data Analysis

Assessment of Use Support. Water quality data is assessed to determine if standards are met and if the waterbody supports its classified use. If monitoring data shows that standards are not achieved, depending on the frequency standards are not met, the waterbody is said to be not supporting or partially supporting the designated use.

Appendix E includes lists of all streams and rivers in the basin for which data have been assessed. The lists include information on the location, data source, designated water use classification, criterion violated, potential cause, actions planned to alleviate the problem, and estimates of stream miles affected. The list is further coded to indicate status of each waterbody under several sections of the Federal Clean Water Act (CWA). Different sections of the CWA require states to assess water quality [Section 305(b)], to list waters still requiring TMDLs [Section 303(d)], and to document waters with nonpoint source problems [Section 319].

The assessed waters are described in three categories: waters supporting designated uses, waters partially supporting designated uses, and waters not supporting designated uses. Waters were placed on the partially supporting list if:

- the chemical data (dissolved oxygen, pH, temperature) indicated an excursion of a water quality standard in 11%-25% of the samples collected or
- a fish consumption guideline was in place for the waterbody.

The partially supporting list also includes stream reaches based on predicted concentrations of metals at low stream flow (7Q10 flows) in excess of State standards as opposed to actual measurements on a stream sample. Generally, a stream reach was placed on the not supporting list if:

- the chemical data (dissolved oxygen, pH, temperature) indicated an excursion of a water quality standard in greater than 25% of the samples collected,
- a fish consumption ban was in place for the waterbody, or
- acute or chronic toxicity tests documented or predicted toxicity at low stream flow (7Q10) due to a municipal or industrial discharge to the waterbody.

Additional specific detail is provided in the following paragraphs on analysis of data for fecal coliform bacteria, metals, toxicity, dissolved oxygen, fish/shellfish consumption advisories, and biotic data.

Fecal Coliform Bacteria. Georgia water quality standards establish a fecal coliform criterion of a geometric mean (four samples collected over a thirty day period) of 200 MPN/100 ml for all waters in Georgia during the recreational season of May- October. This is the year-round standard for waters with the water use classification of recreation. Although the standard is based on a geometric mean, most of the data for Georgia and other states is based on once per month sampling as resources are not available to conduct sampling and analysis four times per month. Thus, for the purposes of this report USEPA recommends the use of a review criterion of 400 MPN/100 ml to evaluate once per month sample results.

This density, 400 MPN/100 ml, was used to evaluate data for the months from May through October for all waters. For waters with the water use classification of recreation, this guidance criterion was used to evaluate data for the entire year. For waters classified as drinking water, fishing, or coastal fishing, the maximum Georgia standard for fecal coliform bacteria is 4000 MPN/100 ml (November-April). This standard was used to evaluate data collected during November through April for these waters. Waters were deemed not supporting uses when 25% of the samples had fecal coliform bacteria densities greater than the applicable review criteria 400 or 4000 MPN/100 ml) and partially supporting when 11% to 25% of the samples were in excess of the review criteria.

Metals. In general, data on metals from any one given site are not frequent. As the data are infrequent, using the general evaluation technique of 25% excursion to indicate nonsupport and 11%-25% excursion to indicate partial support was not meaningful. Streams were placed in the non-supporting category if multiple excursions of state criteria occurred and the data were based on more than four samples per year. With less frequent sampling, streams with excursions were placed on the partially supporting list. In addition, an asterisk is placed beside metals data in those cases where there is a minimal database. A number of stream segments were listed based on one data point exceeding a water quality standard. This is in accordance with USEPA guidance which suggests any single excursion of a metals criteria be listed.

Toxicity Testing/Toxic Substances. Data from EPD toxicity testing of water pollution control plant effluents were used to demonstrate or predict toxicity in the receiving waterbody. Based on the effluent toxicity, receiving waters were evaluated as not supporting when one or more tests gave a clear indication of instream toxicity and as partially supporting when based on predicted instream toxicity. Effluent data for toxic substances were used to designate either partial support or non-support based on whether instream corroborating data were available. When instream data were available, the stream was determined to be not supporting. When instream data were not available, the stream was listed as partially supporting.

Dissolved Oxygen, pH, Temperature. When available data indicated that these parameters were out of compliance with state standards more than 25% of the time, the waters were evaluated as not supporting the designated use. Between 11% and 25% non-compliance resulted in a partially supporting evaluation.

Fish/Shellfish Consumption Guidelines. A waterbody was included in the not supporting category when an advisory for “no consumption” of fish, a commercial fishing ban, or a shellfishing ban was in effect. Waterbodies were placed in the partially supporting category if a guideline for restricted consumption of fish had been issued for the waters.

Biotic Data. A “Biota Impacted” designation for “Criterion Violated” indicates that studies showed a modification of the biotic community. Communities utilized were fish. Studies of fish populations by the DNR Wildlife Resources Division used the Index of Biotic Integrity (IBI) to identify impacted fish populations. The IBI values were used to classify the population as Excellent, Good, Fair, Poor, or Very Poor. Stream segments with fish populations rated as “Poor” or “Very Poor” were included in the partially supporting list.

5.2.4 Assessment of Water Quality and Use Support

This section provides a summary of the assessment of water quality and support of designated uses for streams and major lakes in the Chattahoochee River Basin. Most of these results were previously provided in the report “Water Quality in Georgia, 1994-1995" (Georgia DNR, 1996). Results are presented by Hydrologic Units. Within some Hydrologic Units, results are further subdivided into natural geographic areas, such as streams above and below Lake Lanier in HUC 03130001. A geographic summary of assessment results is provided by HUC in Figures 5-4 through 5-7.

5.2.4.1 Hydrologic Unit Code 03130001 (Upper Chattahoochee River)

This hydrologic unit covers the headwaters of the Chattahoochee River down to the junction with Peachtree Creek, just northwest of Atlanta, and includes parts of the Blue Ridge and Southern Piedmont Provinces (see Figure 2-5). The hydrologic unit is broken into two segments

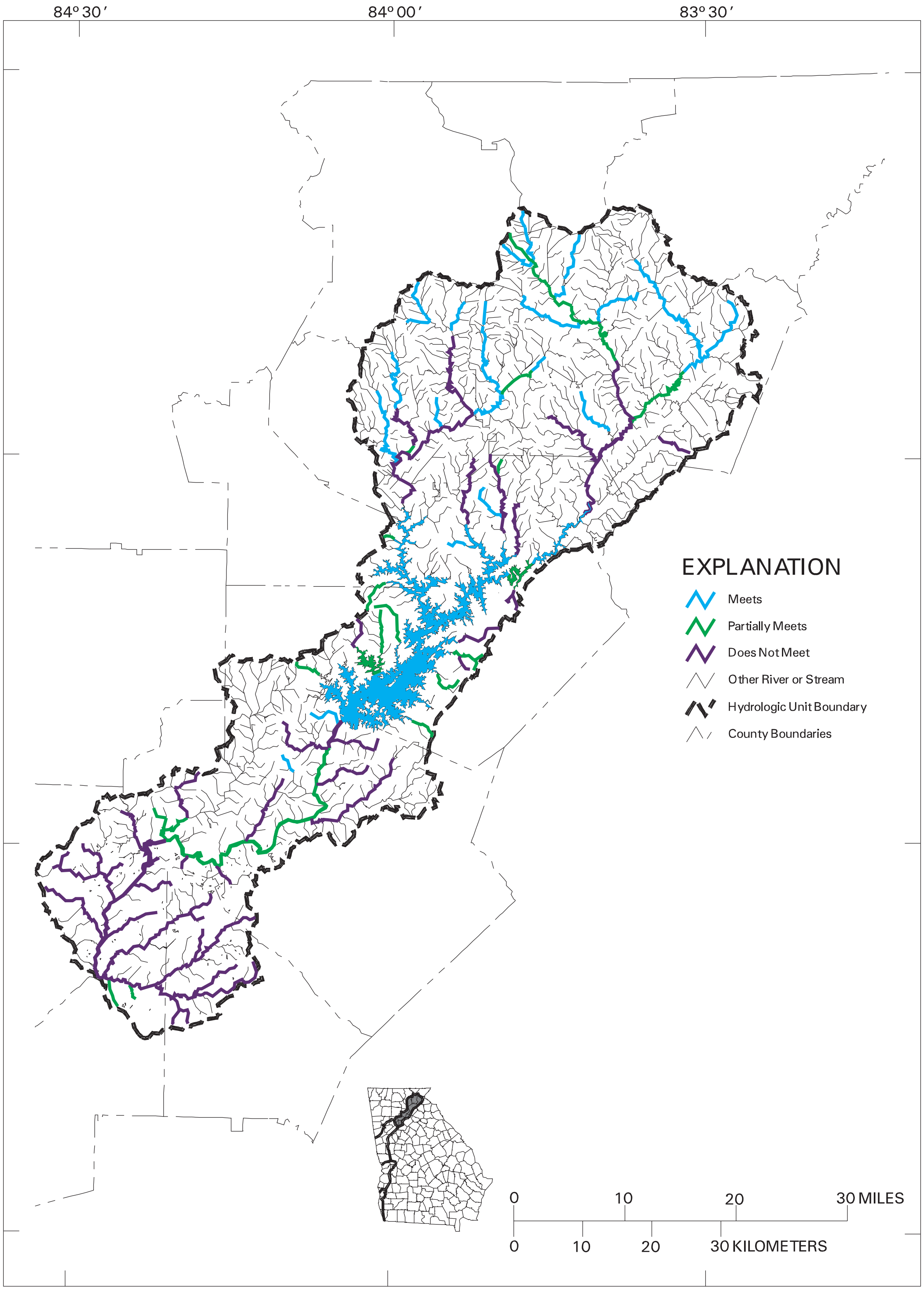

Figure 5-4. Assessment of Water Quality Use Support in the Upper Chattahoochee River Basin, HUC 03130001

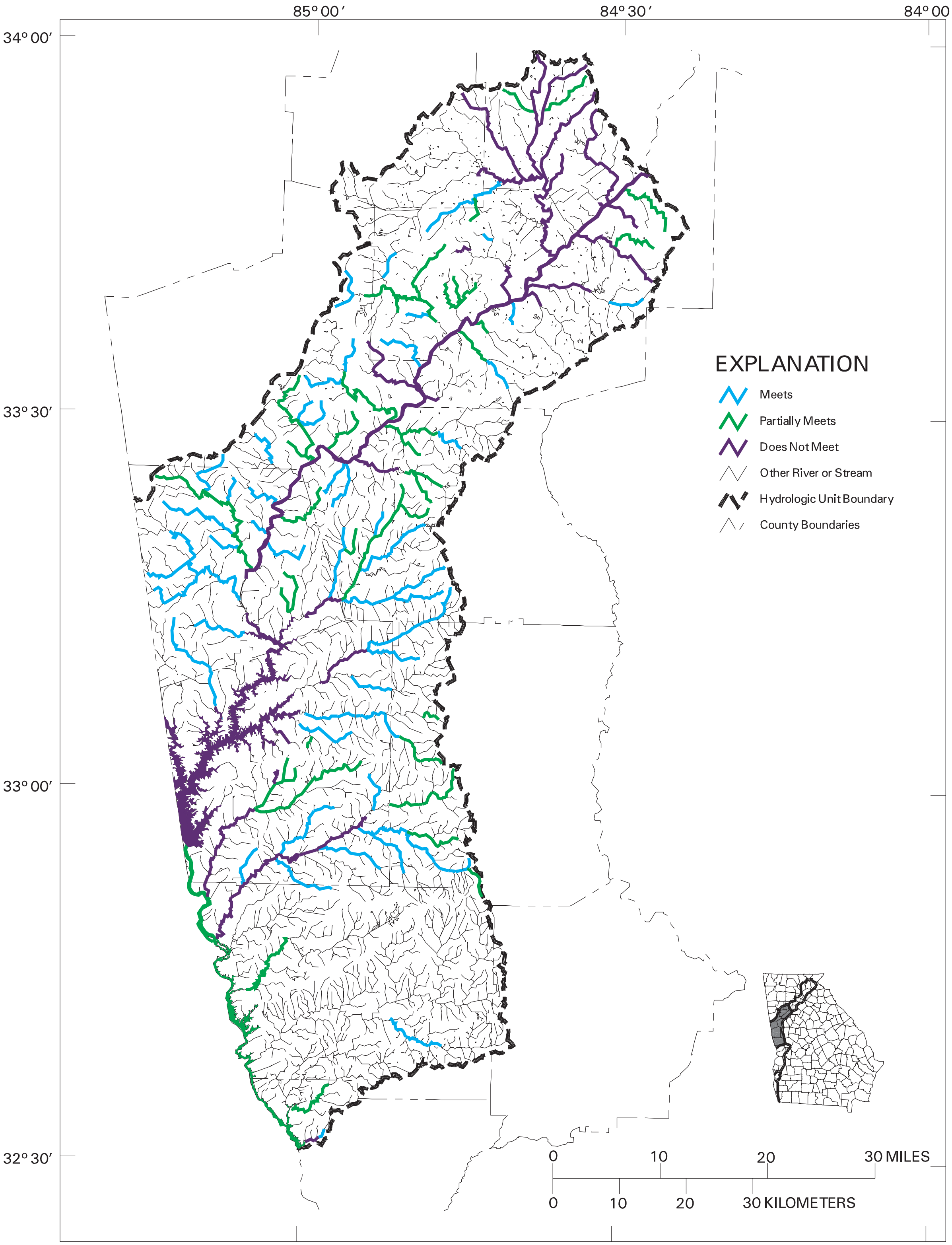

Figure 5-5. Assessment of Water Quality Use Support in the Middle Chattahoochee River Basin, HUC 03130002

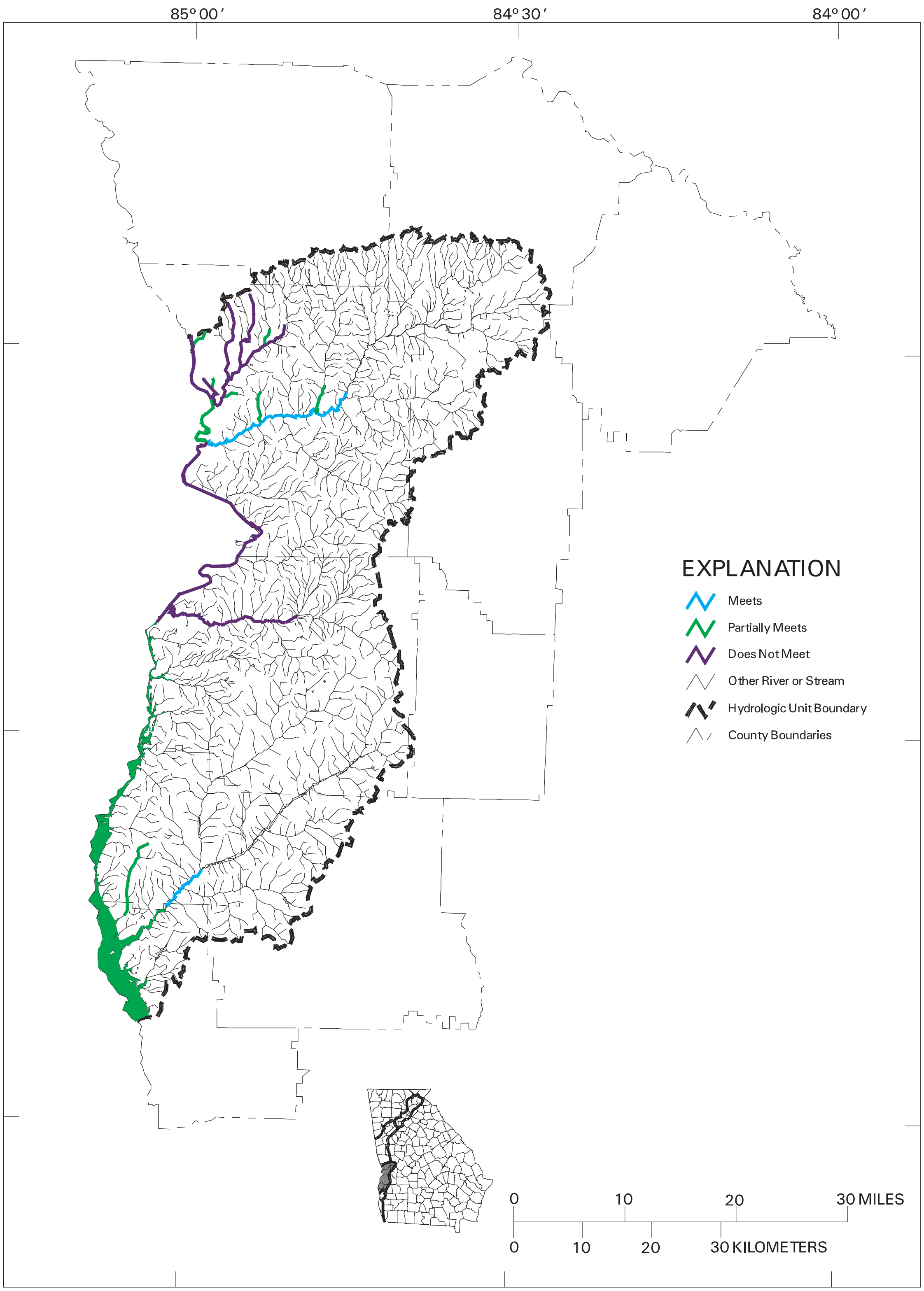

Figure 5-6. Assessment of Water Quality Use Support in the Middle Chattahoochee River Basin, HUC 03130003

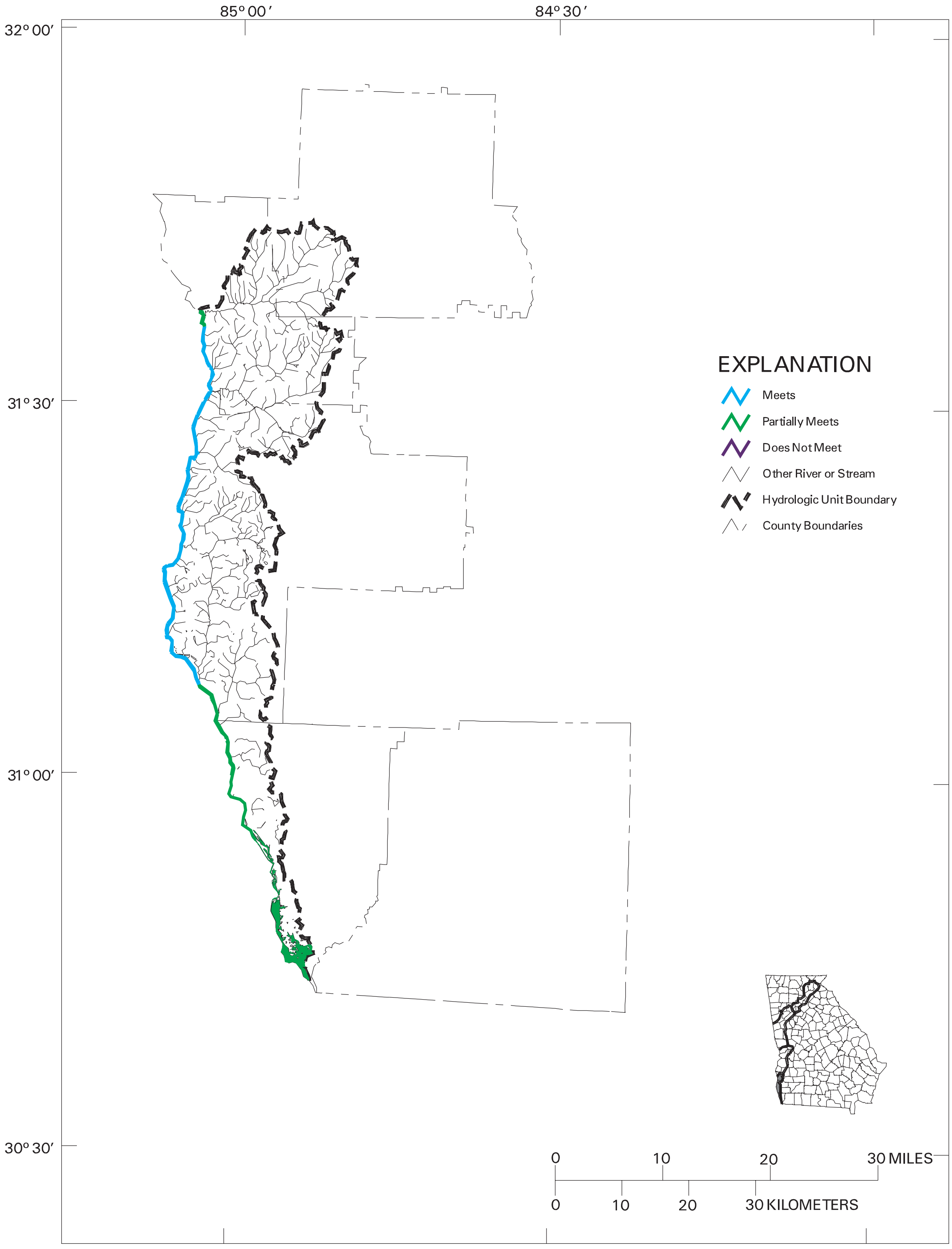

Figure 5-7. Assessment of Water Quality Use Support in the Lower Chattahoochee River Basin, HUC 03130004

by Buford Dam at Lake Lanier, which controls the entire flow in the basin passing River Mile 348.3. Below this point, the character of the river is strongly affected by operation and water releases by Buford Dam. At the southern end of the hydrologic unit, urbanization associated with metropolitan Atlanta is a dominant feature of the watershed.

Appendix E, Table E-1 summarizes the determination of support for designated uses of all assessed rivers and streams within this hydrologic unit (GA DNR, 1996).

HUC 03130001 Area A: Headwaters, above Lake Lanier

Ten river basin monitoring stations were located within this sub-basin during the 1995 period, three of which were on the mainstem. During 1990-1994, four trend monitoring stations were sampled within this basin. Additional data were available at forty-nine stations. Data from the mainstem stations indicate that water quality conditions are being affected by both point and nonpoint source pollution. No excursions of the dissolved oxygen water standard were noted at upstream locations. Jasus Creek near Helen and the Chattahoochee River mainstem downstream from Jasus Creek had excursions of the lead standard. Yahoola Creek downstream from the Dahlonega WPCP had excursions of standards for lead and mercury. Mud Creek downstream from the City of Cornelia WPCP had excursions of the copper and zinc standards. Thirty tributary stations and three mainstem stations had excursions of the standard for fecal coliform bacteria due to non-point sources, including runoff from urban, agricultural and forested areas.

Trout waters in this area are susceptible to habitat degradation and stream warming. Because of rapid development in the mountainous areas, the quality of trout streams may be compromised by sedimentation from land disturbing activities and stream warming resulting from increased run-off from impervious surfaces, removal of riparian canopy, and the construction of small impoundments.

Benthic macroinvertebrate samples were collected at the following four sites in HUC 03130001, Area A in 1995.

Waterbody	Location	County	Date	RBMP II Score	Rating
Chattahoochee River	Helen , GA	White	951012	10	Very Good
Dicks Creek	FAS 144-1	Lumpkin	950815	10	Very Good
Mossy Creek	GA Hwy 254	White	950927	4	Poor
West Fork of Little River	Jess Helton Rd.	Hall	950927	4	Poor

Water quality based on benthic macroinvertebrate data ranged from Very Good to Poor. Potential agriculture nonpoint source impacts may be the cause of Mossy Creek's and West Fork of Little River 's Poor biological condition.

Limited fish tissue in this area of the Chattahoochee River Basin has been tested by EPD. Fish tissue monitoring in Lake Sidney Lanier, which receives runoff from the entire basin upstream, suggests there are not likely to be problems with fish tissue in this area.

HUC 03130001 Lake Water Quality: Lake Sidney Lanier

The Georgia DNR contracted with the University of Georgia (UGA) to conduct a Clean Lakes Phase I Diagnostic/Feasibility study of Lake Lanier in 1991 and 1992. This work was continued by the University of Georgia, North Georgia College, the Tennessee Valley Authority, and other contractors. Completion of this study is scheduled for 1997. Other water quality studies have been performed including the EPA National Eutrophication Survey conducted in 1973, the COE Water Quality Management Study conducted in 1978-79, the Georgia DNR Clean Lakes Program Lake Classification Survey conducted in 1980-81, the Georgia DNR Major Lake Monitoring Project conducted from 1984 through 1993, a Gainesville College study of 100 stations in 1987, the Georgia DNR Clean Lakes Water Quality Assessment Study conducted in 1989, and a North Georgia College study with quarterly monitoring since 1987. The Georgia DNR also maintains an in-lake ambient monitoring station, STORET number 12038001, at Browns Bridge, Georgia Highway 369, with data collection from July, 1977 to date.

The UGA Phase I Feasibility Study draft report states "the overall water quality in Lake Lanier is relatively good as determined by state and Federal standards." The trophic status indices show the lake is mesotrophic with some increase in eutrophication from 1973 to 1991. The main concern is possible water quality degradation if the loading of sediments and nutrients are not maintained at or below current loadings. The management of nutrient loading, particularly phosphorus, the growth limiting nutrient, is an important long-term objective in maintaining the current water quality. Nonpoint loads account for 80 to 90 percent of the total lake nutrient loading. Georgia plans to revise the State Rules and Regulations for Water Quality Control, Chapter 391-3-6, adopting specific water quality standards for Lake Lanier. These standards will include limits on chlorophyll *a*, total nitrogen, and phosphorus loading limits for the lake and its principal tributaries.

Other concerns discussed in the UGA Phase I Feasibility Study draft report include fecal coliform bacteria concentrations in some tributary streams and embayments, storage capacity loss from sedimentation, mercury detected in three water samples (two stations, two sample sets), and stress to striped bass population caused by low dissolved oxygen levels. The Georgia 1994-1995 305(b) Report lists portions of Lake Lanier as not fully supporting the designated use of Recreation due to excursions of standards for mercury, lead, and pH. The UGA report recommends additional metals sampling to assess the metals issue.

The Georgia DNR Wildlife Resources Division (WRD) participates in managing fishery resources in Lake Lanier. In 1986, WRD conducted a survey of the black bass population in Lake Lanier (Fisheries Management Section, 1988), using a tagging study. Annual estimates of survival, mortality and exploitation rates were determined from tag returns, and these data were used to predict the effect of more restrictive length limit regulations on yield and bass abundance. The 0.57 survival rate observed for largemouth bass was more than twice the 0.27 rate estimated for spotted bass. Natural mortality was the major factor influencing survival and was estimated at 0.42 for spotted bass and 0.27 for largemouth bass. The spotted bass exploitation rate of 0.31 appeared moderate, but there was no clear indication of over harvest in spite of the absence of a minimum length limit. The low largemouth bass exploitation rate (0.16) suggests that anglers are removing a small percentage of the population, therefore a minimum length limit larger than the existing 12 inch (304 mm) limit would likely have little impact on fish abundance.

In the early 1980s, Lake Lanier supported a trophy striped bass fishery, but declining summertime hypolimnetic dissolved oxygen levels, thought to be associated with increased nutrient loading and eutrophication, now limit the lake's ability to produce striped bass exceeding 20 pounds in size. WRD currently depends heavily on Lake Lanier as a source of brood stock for producing fingerling striped bass for stocking other reservoirs in the state and for replenishing the depleted natural population in the Savannah River. Nutrient input from the watershed, associated with rapid development and human population growth, is likely the primary cause of accelerated eutrophication.

Fish tissue quality in Lake Lanier has generally been found to be safe, with few consumption guidelines needed. Current guidelines for eating fish from Lake Sidney Lanier are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which will be published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrants a change.

Fish Consumption Guidelines

Lake Lanier

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass		No Restrictions	No Restrictions	
Catfish		No Restrictions	No Restrictions	
Carp			1 meal per month	PCBs

HUC 03130001 Area B: Below Buford Dam

Six trend monitoring stations were located within this sub-basin during the 1995 period, four of which were on the mainstem. During 1990-1994, the same six trend monitoring stations were sampled within this basin. Additional monitoring data were available at twenty-seven stations. Data from the mainstem stations indicate that water quality conditions are being negatively affected by both point and nonpoint source pollution. Excursions of the dissolved oxygen water standard due to stratification in Lake Lanier were noted downstream from Buford Dam on the mainstem and in Clear Creek in the City of Atlanta, perhaps responding to the combined effects of a Combined Sewer Overflow and nonpoint runoff. Twenty-six monitored tributaries draining the Metropolitan Atlanta area, which constituted the majority of this sub-basin had excursions of standards for metals, including lead, copper, zinc and cadmium, and excursions of the standard for fecal coliform bacteria. "Urban Runoff" is the most commonly assessed cause of non-support in this area.

Between March 1993 and April 1994, USGS conducted a special study with weekly sampling and analysis for 84 common pesticides within Sope Creek, a 30 mi^2 watershed in the metropolitan Atlanta area in which the land use is 83 percent urban (Hippe et al., 1994). Target analytes included many pesticides used for weed and insect control in the area, although a number of commonly used pesticides were not covered in the analysis, including paraquat, methanearsonate, glyphosate, DSMA, MSAMA, and several chlorophenoxy herbicides. Results for this watershed are suspected to be typical of other urban watersheds in the basin, which have generally not been sampled for pesticides. Eighteen herbicides and seven insecticides were detected in water samples from Sope Creek watershed. Median concentrations for each detected pesticide were well below EPA standards and guidelines for drinking water. In one sample, the maximum observed concentration for the herbicide simazine exceeded the maximum contaminant level (MCL) for drinking water allowed by EPA drinking-water standards; however, the median concentration for all samples was only 3 percent of the MCL. Atrazine and diazinon were detected throughout the year, but had median concentrations that were only 1 percent of the MCL and 3 percent of the lifetime health advisory, respectively. Maximum concentrations of five detected insecticides and median concentrations of chlorpyrifos and diazinon exceeded EPA guidelines for protection of aquatic life; however, EPA has not promulgated national standards for these insecticides. The data suggest the possibility of significant adverse impacts on aquatic life. As noted below, however, fish species composition in Sope Creek appears less impacted than that in many other urban tributaries of metropolitan Atlanta.

Within the Chattahoochee mainstem, the tailwater trout fishery faces the same types of threats as noted for mountain streams in Area A. Rapid development in the Atlanta metropolitan area results in considerable sediment input, and warm water runoff from tributaries can push river temperatures up to marginal conditions for trout, especially during summer storm events. Seasonally low dissolved oxygen and high iron and manganese levels in tailwater releases from Buford dam impact the productivity and health of the aquatic system. Hydropower production during peak demand times results in alteration of natural flows in the tailwater and bank erosion below Buford Dam.

Aquatic habitat in tributary streams in the metropolitan Atlanta area has been affected by urbanization. In November 1993, personnel from the USGS surveyed fish in sections of nine tributaries of the Chattahoochee River Basin in Metropolitan Atlanta (Couch et al., 1995). Eight of the tributaries, Nickajack Creek, Rottenwood Creek, Sope Creek, Willeo Creek, Nancy Creek, Peachtree Creek, Proctor Creek, and Utoy Creek, receive runoff from urban areas such as subdivisions, office and industrial parks, shopping malls, airports, roads, and golf courses. In addition to these urban basins, Snake Creek was surveyed to provide a comparison of fish populations in a mostly forested basin. These creeks are at the border between Hydrologic Units 03130001 and 03130002, with Rottenwood, Sope, Willeo, Nancy, and Peachtree Creeks falling in HUC 03130001 and the remainder in 03130002.

USGS sampled these streams with a combination of backpack electro-fishing and seining. Results are summarized in Table 5-6. Although the 8 urban streams vary from 2 to 15 in the number of native species found, they share several characteristics in their fish populations.

Generally, fewer numbers of individual fish were found in the urban streams, and a larger percentage of non-native species were found in Nancy, Peachtree, Rottenwood, Proctor, and Utoy Creeks. One potential cause of degradation is alteration of the stream bottom habitat by filling in natural gravel and cobble substrates with sand and silt as a result of erosion in the watershed. Native minnow and sucker species were almost completely absent in Nancy, Peachtree, Rottenwood, Proctor, and Utoy Creeks. These 5 creeks differ from Sope, Nickajack, and Willeo Creeks in having a greater amount of or proximity to industrial, commercial, and transportation areas.

Table 5-6. Fish Species Identified in Metropolitan Atlanta Tributary Streams (Couch et al., 1995), Arranged in Decreasing Order of Number of Native Species.

Creek	Total Native Species	Total Species	Total Individuals	Percent Non-native
Snake Creek (reference site)	16	17	641	< 1
Sope Creek	15	18	307	2
Nickajack Creek	13	16	282	17
Willeo Creek	12	13	185	<1
Nancy Creek	11	15	220	38
Peachtree Creek	11	15	1740	29
Rottenwood Creek	5	8	80	47
Proctor Creek	2	5	224	91
Utoy Creek	2	3	5	40

The large number of mosquitofish found in Peachtree Creek may indicate poor water quality. Similar to the non-native red shiner, white sucker and green sunfish species, mosquitofish are tolerant of a wide range of water-quality conditions. After mishaps, such as sewer overflows which impact fish populations, mosquitofish can repopulate a stream rapidly. They have short life cycles, and unlike other fish species found in these streams, bear their young live rather than lay eggs.

Benthic macroinvertebrate samples were collected from two sites in HUC 03130001, Area B during the basin assessment in 1995:

Waterbody	Location	County	Date	RBMP II Score	Rating
Ivy Creek	Interstate 985	Gwinnett	950928	0	Very Poor
Unnamed trib to Ivy Creek	below Hwy 20	Gwinnett	950928	6	Good

The unnamed tributary to Ivy Creek had good water quality based on benthic macroinvertebrate data. Further downstream on Ivy Creek at I-985, benthos data suggests a very poor biological condition due in part to instream habitat destruction and a significant reduction in Ephemeroptera, Plecoptera, and Trichoptera pollution-sensitive taxa. Nonpoint runoff may be contributing to much of the impact found at this site. In addition, there was sewerline construction occurring in this area of the watershed.

Additional biological assessments are being conducted as part of the City of Atlanta Urban Watershed Initiative (Hall and Richards, 1997). This study noted significant biological impairment (benthos and fish) at all stations sampled. Severe habitat degradation (erosion and sedimentation) was a primary contributor at many sites, yet even sites with excellent or good habitat showed biological impairment.

Guidelines for eating fish from this section of the Chattahoochee River Basin are listed in the following tables. This guidance may differ from the guidance issued in the 1994-1995 305(b)

Report because of additional samples collected in 1995. The data shown in these tables are the new guidance which was published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Chattahoochee River -- Lanier Dam to Morgan Falls Dam

Species	Site Tested	Recommendation	Chemicals
Brown Trout	Lanier Dam to Morgan Falls Dam	No Restrictions	
Rainbow Trout	See Above	1 meal per week	Mercury
Carp	See Above	1 meal per month	PCBs / Chlordane
Spotted Sucker	See Above	No Restrictions	
Largemouth Bass	See Above	1 meal per week	PCBs / Chlordane
Yellow Perch	See Above	1 meal per week	PCBs / Chlordane
Redear Sunfish	See Above	No Restrictions	

Fish Consumption Guidelines

Chattahoochee River -- Morgan Falls Dam to Peachtree Creek

Species	Site Tested	Recommendation	Chemicals
Largemouth Bass	Below Morgan Falls Dam	No Restrictions	
Carp	See Above	1 meal per month	PCBs

5.2.4.2 Hydrologic Unit Code 03130002 (Middle Chattahoochee River from Atlanta to Columbus)

Hydrologic Unit 03130002 contains the Chattahoochee River Basin between Atlanta and Columbus, at the Fall Line, and is located entirely within the Southern Piedmont land resource area (see Figures 2-3 and 2-6). Both the northern and southern ends of this hydrologic unit have significant urbanization, while much of the area between is in forest and other rural land uses. The Chattahoochee is free-flowing between Atlanta and West Point Lake. There are eight hydroelectric dams between West Point Lake and Columbus, which take advantage of the natural gradient of this section of the river.

Appendix E, Table E-2 summarizes the determination of support for designated uses of rivers and streams within this hydrologic unit, based on analysis of 1994–1995 data (GA DNR, 1996).

HUC 03130002 Area A: Chattahoochee and Tributaries from below Peachtree Creek to West Point Lake

Nine trend monitoring stations were located within this sub-basin during the 1995 period, four of which were on the mainstem. During 1990-1994, six trend monitoring stations were sampled within this basin. Additional monitoring data were available at ninety-eight stations. Data from the mainstem stations indicate that water quality conditions are being negatively affected by both point and nonpoint source pollution. Excursions of the dissolved oxygen water standard were noted in Sandy Creek in Fulton County, responding to the effects of urban runoff. On the mainstem at three monitored sites excursions of standards for fecal coliform bacteria and lead were measured. Also on the mainstem immediately downstream from two metro-area Atlanta wastewater treatment facilities and a coal-fueled electric power plant the standard for temperature was exceeded. Fifteen monitored tributaries in the sub-basin had excursions of standards for metals, including lead, copper, cadmium and mercury. Forty-five monitored tributaries had excursions of the standard for fecal coliform bacteria.

Aquatic life in the Chattahoochee River from Peachtree Creek downstream to West Point Lake has been impacted by urban runoff and municipal/industrial discharges from the City of Atlanta. In 1990–92, the DNR Wildlife Resources Division conducted a study of the status of fish populations in the Chattahoochee below Atlanta (Fisheries Management Section, 1992). This report documents the following findings: Indices of abundance, diversity and health of the fish population found in the first 64 km of the Chattahoochee River downstream of Atlanta were investigated using electrofishing data. Fish catch-per-unit-effort (CPUE) was considered low and samples were dominated by bluegill (*Lepomis macrochirus*; 32 %) and carp (*Cyprinus carpio*, 21 %). Carp comprised approximately 75% of the biomass. Biotic integrity of the population ranged from 37% to 53% of normal. Bluegill were considered to be in a normal state of health using gross examination in the field and histological techniques in the laboratory.

Water quality within this segment has improved immensely since 1972 when the study area was described as "...in near septic condition for a reach of 35 miles" (GA DNR, 1972). This improvement is due to enhanced treatment of sanitary sewage. In recent years, water quality standards for the "Fishing" use classification have been satisfied most of the time. Exceptions in recent years were levels of dissolved oxygen ($\leq$ 4 mg/L) which occurred during a period of severe drought in 1988. A major fish kill occurred in this area during October 1988, but a causative agent was not, however, identified. Other than this event, fish kills in the river have not been commonplace since 1976. WRD reports that kills in tributary streams have been a major problem for many years. Causative agents could not be identified for many of these kills, but natural causes (e.g., infectious diseases) were eliminated in most every case. Discharges of raw sanitary sewage and industrial chemicals were identified most often as causative agents.

In the Metropolitan Atlanta area, degradation of habitat and water quality of tributary streams appears to have resulted in a decreased population of native fish species and increased importance of non-native pollution-tolerant species. Couch *et al*. (1995) discuss fish species occurrence in various tributaries in this reach, including Snake, Nickajack, Proctor, and Utoy Creeks, along with other metropolitan Atlanta tributaries falling within Hydrologic Unit 03130001. Results for these creeks are given above in the discussion of Hydrologic Unit 03130001, Area B.

Benthic macroinvertebrate samples were collected from two sites in this sub-basin in 1995:

Waterbody	Location	County	Date	RBMP II Score	Rating
Centralhatchee Creek	Armstrong Mill Rd.	Heard	950831	8	Very Good
Chattahoochee River	Bush Head Shoals	Heard	951002	5	Poor

The Rapid Bioassessment II index score for the Chattahoochee River at Bush Head Shoals suggests good water quality; however, the overall rating was poor due in part to a significant reduction in EPT taxa.

Guidelines for eating fish from this section of the Chattahoochee River Basin are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which was be published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Chattahoochee River -- Peachtree Creek to Franklin, GA

Species	Site Tested	Recommendation	Chemicals
Largemouth Bass	Peachtree Creek to Franklin, Ga	1 meal per month	PCBs / Chlordane
Carp	Peachtree Creek to Franklin, Ga	1 meal per month	PCBs / Chlordane
Channel Catfish	Peachtree Creek to Franklin, Ga	1 meal per week	PCBs / Chlordane
Striped Bass	Peachtree Creek to Franklin, Ga	1 meal per month	PCBs

HUC 03130002 Lake Water Quality: West Point Lake

The water use classifications for West Point Lake are Fishing in the headwaters, and Recreation throughout the remainder of the lake. A large body of work has been conducted on West Point Lake since 1970. Some of the earlier work includes a 1970-1971 Environmental Impact Study, 1975-1976 *Environmental Evaluation of Releases From West Point Dam* report, 1978-1979 Water Quality Management Studies and a 1979 *Fisheries and Limnological Studies* report, all by the Army Corps of Engineers. The U.S. Department of the Interior conducted a study on Effects of Nutrients on Algal Growth in 1975-1976. Georgia had a West Point Lake Reservoir Monitoring Project in 1975, the Georgia Clean Lakes Classification Survey in 1980 and 1981, and the Georgia DNR Major Lakes Monitoring Project (MLMP) from 1984 through 1993. West Point Lake was documented as being excessively eutrophic, having water quality problems lake-wide that resulted in impairment of its designated uses. The Georgia DNR and the U.S. EPA conducted a study of phosphorus loading in 1987 and 1988. The result of this study was administrative orders issued by EPD to the major dischargers on the Chattahoochee River to limit the discharge concentration of total phosphorus to 0.75 mg/l. The Georgia DNR, Alabama DEM, and the U.S. EPA initiated a Phase 1 Diagnostic Feasibility Study of West Point Lake in 1991-1992. This study was performed by La Grange College, the University of Georgia and Auburn University. The study resulted in the adoption of lake water quality standards in 1995 for West Point Lake. Also, the Chattahoochee River Modeling Project (CRMP, 1993-1997) will provide important input data for the water quality model currently being built by the Army Corps of Engineers for West Point Lake. This model is scheduled for completion in 1998. The 1994-1995 305(b) Report listed West Point Lake as not supporting its water use classification of Fishing/Recreation due to Fish Consumption Guidelines, discussed below. Non-point source and urban runoff are the suspected causes.

Guidelines for eating fish from West Point Lake are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which was published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

West Point Lake

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass	*	*	No Restrictions	
Hybrid Bass	No Restrictions	1 meal per week	1 meal per week	PCBs
Channel Catfish		1 meal per week	1 meal per month	PCBs
Carp		1 meal per week	1 meal per week	PCBs
Black Crappie	No Restrictions			

* Only largemouth bass 16 inches and longer may be legally retained and possessed on West Point Lake.

HUC 03130002, Area B: Chattahoochee and Tributaries, West Point Dam to Oliver Dam

Five trend monitoring stations were located within this sub-basin during the 1995 period, one of which was on the mainstem. During 1990-1994, two trend monitoring stations were sampled within this basin. Monitoring data were also available from an additional twenty-one stations. Data from the mainstem stations indicate that water quality conditions are impacted by both point and nonpoint source pollution. Excursions of the dissolved oxygen water standard were noted in the river downstream of West Point Dam due to releases of oxygen-depleted bottom water from the dam. Excursions of the dissolved oxygen standard were also measured in Ollie Creek in Meriwether county, probably due to non-point sources and in Long Cane Creek near LaGrange as a result of urban runoff. Four monitored tributaries had excursions of standards for metals lead, copper and zinc. Eight tributary stations had excursions of the standard for fecal coliform bacteria attributed to urban runoff and other non-point sources.

For a distance of approximately 13 miles downstream from West Point Lake, reduced flows and low dissolved oxygen levels have impacted aquatic communities in the Chattahoochee River. Since the construction of West Point Reservoir the fish population structure of the river downstream has changed from one characterized by riverine species to one dominated by the same fish that inhabit the upstream reservoir. Indigenous populations of shoal bass, a threatened species in Georgia, have declined and may no longer be present in this portion of the river.

Low dissolved oxygen levels below West Point reservoir have been identified as the cause of two fish kills in the tailwater. The severity of this problem is inconsistent, primarily reflecting the stratification of the reservoir during the summer months. During summers of unusually high rainfall, increased flows in the reservoir decrease stratification and ameliorate chronic low dissolved oxygen levels in the tailwater.

Hydropeaking operation of West Point Dam results in significant alteration of natural stream flows. While major flood events are largely unaltered, it is likely that intermediate high flow events occur less frequently while low flow events occur much more frequently. Daily flow fluctuations are also markedly greater in magnitude.

Two locations in this sub-basin were sampled for benthos in 1995:

Waterbody	Location	County	Date	RBMP II Score	Rating
Mulberry Creek	Co. Rd. 209	Harris	950831	5	Poor
Flat Shoals Creek	GA Hwy 103	Troup	950907	8	Very Good

Even though the Rapid Bioassessment II Index suggests Good water quality, the Mulberry Creek collection produced a Poor rating due in part to instream habitat destruction. There was a considerable amount of stream bank stability failure occurring in this part of the watershed.

Fish tissue within this area of the Chattahoochee River has not been tested because fish collected in Lake Harding and Goat Rock Lake are thought to be representative of the fish that would be collected in the small stretch of River north of these two Lakes.

HUC 03130002 Lake Water Quality: Lake Harding (Bartlett's Ferry Reservoir)

Bartlett's Ferry Reservoir, also called Lake Harding, is located approximately 7 miles northwest of Columbus, Georgia, on the Alabama-Georgia border. The water use classification for the Chattahoochee River is Fishing from West Point Manufacturing Company to Osanippa Creek, which includes the headwaters of Lake Harding. The remainder of the lake is classified Recreation and Drinking Water.

The US EPA included Lake Harding in their 1973-1974 National Eutrophication Study. It was one of 15 Georgia lakes in the study. The report was issued in June of 1975. Other water quality studies have been performed on Lake Harding, including the Georgia Clean Lakes Program Lake Classification Survey conducted in 1980 and 1981, the Georgia DNR Major Lake Monitoring Project (MLMP) from 1984 through 1993, and the Georgia Clean Lakes Water Quality Assessment Study conducted in 1989. Additional studies have been produced by Georgia Power and the Alabama Department of Environmental Management (ADEM). The 1973-1974 study documented that Lake Harding was highly eutrophic. It ranked last in overall trophic quality of the Georgia lakes tested, with the highest median total phosphorus, median dissolved phosphorus and median inorganic nitrogen. The impoundment of West Point Lake in 1975-1976 is thought to have improved water quality in Lake Harding. Most recently, the MLMP Report for 1993 indicated that phosphorus levels for the 11 lower Piedmont lakes, including Harding, ranged from 0.05 to 0.09 mg/l. Lake Harding was measured at 0.07 mg/l levels.

The 1994-1995 305(b) Report listed Lake Harding as only partially supporting its water classification of Fishing/Recreation. The reason for the "partial support" designation were the fish consumption guidelines issued for the lake, believed to be necessary due to nonpoint pollution sources. The guidelines are for the whole lake.

Guidelines for eating fish from Lake Harding are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which was published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Lake Harding (Bartlett's Ferry)

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass		1 meal per week	1 meal per month	PCBs
Hybrid Bass	1 meal per week		1 meal per month	PCBs
Channel Catfish	1 meal per week	1 meal per month	1 meal per month	PCBs
Crappie	No Restrictions	No Restrictions		

HUC 03130002 Lake Water Quality: Goat Rock Lake

The water use classification for Goat Rock Lake, also known as Goat Rock Reservoir, is Recreation and Drinking Water. The US EPA included Goat Rock Lake in their 1973-1974 National Eutrophication Study. Although not one of the targeted study lakes, data were collected in the headwaters of Goat Rock Lake in the study of Lake Harding. Other water quality studies have been performed on Goat Rock Lake, including *Water Quality Above and Below Goat Rock Dam, 1972 through 1977* (GA DNR), Georgia DNR Clean Lakes Program Lake Classification Survey conducted in 1980 and 1981, Bartletts Ferry Water Quality Report, 1982, 1984, 1987 (Georgia Power) and the Georgia DNR Major Lakes Monitoring Project (MLMP) from 1984 through 1993. Additional studies have been produced by Georgia Power and the Alabama Department of Environmental Management (ADEM). The MLMP Report for 1993 indicated that phosphorus levels for the 11 lower Piedmont lakes, including Goat Rock, ranged from 0.05 to 0.09 mg/l. Goat Rock Lake was measured at 0.09 mg/l levels. A total trophic state index was calculated for all 27 lakes sampled. The index ranged from a high of 196 (worst) to a low of 122 (best). The index for Goat Rock Lake was 173.

The 1994-1995 305(b) Report listed Goat Rock lake as only partially supporting its water quality classification of fishing. Copper was detected in a single sample in excess of water quality standards, and fish consumption guidelines are in effect. It is believed that nonpoint source pollution is responsible for the problems. Approximately 60% of the lake area is affected.

Guidelines for eating fish from Goat Rock Lake are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which was published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Goat Rock Lake

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass		1 meal per week	1 meal per month	PCBs
Hybrid Bass	1 meal per month		1 meal per month	PCBs
Black Crappie	No Restrictions			
Channel Catfish		No restrictions	1 meal per month	PCBs
Spotted Sucker			1 meal per week	PCBs

HUC 03130002 Lake Water Quality: Lake Oliver

The water use classification for Lake Oliver is Recreation and Drinking Water. Water quality studies have been conducted on Lake Oliver since its impoundment in 1959. These include the Georgia DNR Clean Lakes Classification Survey conducted in 1980 and 1981 and the Georgia DNR Major Lakes Monitoring Project (MLMP) from 1984 through 1993. Additional studies will be found with Georgia Power, the Alabama Department of Environmental Management (ADEM) and the City of Columbus. The MLMP report for 1993 indicated that phosphorus levels for the 11 lower Piedmont lakes, including Lake Oliver, ranged from 0.05 to 0.09 mg/l. Lake Oliver was measured at 0.08 mg/l. A total trophic state index was calculated for all 27 lakes sampled. The index ranged from a high of 196 (worst) to a low of 122 (best). The index for Goat Rock Lake was 170.

The 1994-1995 305(b) Report listed Lake Oliver as not supporting its Drinking Water/ Recreation classification. This was due to the issuance of fish consumption guidelines, which are in effect for the whole lake. The problem is believed to be due to nonpoint source pollution.

Guidelines for eating fish from Lake Oliver are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which will be published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Lake Oliver

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass		1 meal per week	1 meal per month	Mercury PCBs
Catfish		1 meal per month	1 meal per month	PCBs
Bluegill	No Restrictions			
Redear Sunfish	No Restrictions			

5.2.4.3 Hydrologic Unit Code 03130003 (Middle Chattahoochee River from Columbus to Lake Walter F. George)

Hydrologic Unit 031300003 runs from Columbus, GA to Walter F. George Lock and Dam, and lies primarily within the Georgia Sand Hills land resource area (see Figure 2-7). Lake George, with a surface area of 45,181 acres at full pool, is the dominant feature of this hydrologic unit.

Appendix E, Table E-3 summarizes the determination of use support for designated uses of rivers and streams within this hydrologic unit, based on analysis of water quality data (GA DNR, 1996).

Five trend monitoring stations were located within this sub-basin during the 1995 period, three of which were on the mainstem. During 1990-1994, three trend monitoring stations were sampled within this basin. Additional monitoring data were available from twelve stations. Data from the mainstem stations indicate that water quality conditions are being impacted by both point and nonpoint source pollution. No violation in the dissolved oxygen water quality standard was measured in the sub-basin. On the mainstem in the Columbus area the standard for fecal coliform bacteria was exceeded due to urban runoff. Three tributary stations had excursions of the standard for fecal coliform bacteria in the Columbus area. Two tributaries of Lake Walter F. George had excursions of the fecal coliform bacteria standard. Eight monitored tributaries draining the urban area of Columbus in the most upstream part of this sub-basin had excursions of the copper standard.

Benthic macroinvertebrate samples were collected at the following four sites during the basin assessment in 1995:

Waterbody	Location	County	Date	RBMP II Score	Rating
South Fork Upatoi Creek	GA Hwy 22	Talbot	950816	8	Very Good
Pine Knot Creek	GA Hwy 355	Marion	950816	6	Good
Pataula Creek	co. rd. 31	Randolph	950830	6	Good
Chattahoochee River	½ mile d/s Oswichee Ck. confluence	Chattahoochee	950919	1	Very Poor

The Chattahoochee River location was difficult to sample due to its non-wadeable condition and habitat availability. Very few EPT taxa were collected at this site. Causes for a Very Poor biological condition rating are due in part to channel alteration for navigation purposes and regulated water flows by Oliver Dam in Columbus.

Guidelines for eating fish from this section of the Chattahoochee River Basin are listed in the following tables. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in these tables are the new guidance which were published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Chattahoochee River -- Oliver Dam to Chattahoochee County

Species	Site Tested	Recommendation	Chemicals
Largemouth Bass	Eagle Phenix Dam to Chattahoochee Co.	No Restrictions	
Channel Catfish	See Above	1 meal per week	PCBs

Fish Consumption Guidelines

Chattahoochee River-Chattahoochee and Stewart Counties

Species	Site Tested	Recommendation	Chemicals
Largemouth Bass	Oswichee Creek to Omaha, Ga	No Restrictions	
Crappie	See Above	No Restrictions	
Channel Catfish	See Above	No Restrictions	

HUC 03130003 Lake Water Quality: Walter F. George Reservoir

Walter F. George Reservoir is formed by the United States Army Corps of Engineers (COE) dam near Fort Gaines, Georgia. The water use classification of the reservoir upstream of the Cowikee Creek confluence is Fishing; the balance of the reservoir is classified Recreation.

The Georgia DNR conducted a Clean Lakes Phase I Diagnostic/Feasibility study of this reservoir in 1990 and 1991. This work was continued by the U.S. Army Corps of Engineers and Auburn University in 1992, and a second Phase I Diagnostic/Feasibility study was conducted by the Alabama Department of Environmental Management (ADEM) and Auburn University in 1992 and 1993. Other water quality studies have been performed including the EPA National Eutrophication Survey conducted in 1973 and 1974, the Georgia DNR Clean Lakes Program Lake Classification Survey conducted in 1980 and 1981, the Georgia DNR Major Lake Monitoring Project conducted from 1984 through 1993, and the Georgia DNR Clean Lakes Water Quality Assessment Study conducted in 1989.

A joint Feasibility Study report, prepared by Georgia DNR and Alabama DEM in 1996, concluded the reservoir was in relatively good condition. No water use impacts (fishing and recreation) were documented. The trophic status was documented as eutrophic. Therefore, the management of nutrient loading, particularly phosphorus, is an important long-term objective in maintaining the current water quality. On November 6, 1996, Georgia revised the State Rules and Regulations for Water Quality Control, Chapter 391-3-6, adopting specific water quality standards for the Walter F. George Reservoir. These standards include limits on chlorophyll *a*, total nitrogen, and phosphorus loading limits for the Chattahoochee River and the Reservoir. Monitoring for compliance with these standards began in 1997.

Recently, the nuisance aquatic weed Hydrilla was identified in a few locations in Lake W. F. George, and there is some concern that it will become abundant enough to cause adverse impacts on the fishery and on other recreational uses. Other concerns discussed in the Phase I Feasibility Report included metals detected in water samples (one sample set), chlordane detected in headwater fish samples, and small populations of nuisance aquatic plants including stands of alligator weed. The Georgia 1994-1995 305(b) Report lists portions of Walter F.

George Reservoir as not fully supporting the designated uses of Recreation and Fishing due to excursions of the water quality standard for lead and fish consumption guidelines.

The Georgia DNR Wildlife Resources Division (WRD) participates in managing fishery resources in the Walter F. George Reservoir. WRD data indicate that Lake George supports a healthy sport fish population. The standing crop game fish populations had significant increases from the 1975/1978 survey period to the 1987/1990 survey period. Predatory game fish increased by 240 percent and non-predatory game fish increased by 170 percent.

Guidelines for eating fish from Lake Walter F. George are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which will be published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Lake Walter F. George (Eufaula)

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass	*	*	1 meal per week	Mercury, PCBs
Hybrid Bass		1 meal per month	1 meal per month	Chlordane, PCBs
Catfish	No Restrictions	No Restrictions	1 meal per month	Chlordane, PCBs
Crappie	No Restrictions			

*Only largemouth bass 16 inches and longer may be legally retained and possessed on Lake Walter F. George.

5.2.4.4 Hydrologic Unit 03130004 (Lower Chattahoochee)

Hydrologic Unit 031300004 runs from Walter F. George Lock and Dam at Fort Gaines, Georgia to Lake Seminole, at the Georgia/Florida border, and is primarily within the Southern Coastal Plain land resource area (see Figure 2-8). Only a few small tributaries enter the Chattahoochee from the Georgia side in this reach, so assessment focuses on the mainstem, which is controlled for navigation.

Appendix E, Table E-4 summarizes the determination of support for designated uses of rivers and streams within this hydrologic unit, based on analysis of 1994–1995 data (GA DNR, 1996).

Four trend monitoring stations were located within this sub-basin during the 1995 period, all of which were on the mainstem. During 1990-1994, one trend monitoring station was sampled within this basin. No additional sampling was conducted. Data from the mainstem stations indicate that water quality conditions are being negatively affected by both point and nonpoint source pollution. The water quality standard for lead was exceeded due to non-point sources and the mainstem from U.S. Highway 84 to Lake Seminole was affected. No other excursions of water quality standards were measured.

Periodic fish kills have occurred below Lake George for a number of years. These are attributed to low dissolved oxygen in releases from W.F. George Lock and Dam.

Benthic macroinvertebrates were collected from a single location in HUC 03130004 in the summer of 1995.

Waterbody	Location	County	Date	RBMP II Score	Rating
Kolomoki Creek	Co. Rd. 134 at Co. border	Clay/Early	950829	10	Very Good

Fish tissue in this area of the Chattahoochee River Basin was sampled for the first time in the fall of 1996. Samples are being analyzed at this time and data will not be available until fall of 1997. This data will be used to produce guidance for fish consumption in the 1998 Georgia Sport Fishing Regulation and 1998 Guidelines for Eating Fish from Georgia Waters booklet.

HUC 03130004 Lake Water Quality: Lake Seminole

Lake Seminole, terminus of the Chattahoochee and Flint basins, has a designated water use classification of Recreation. Various quality studies have been performed including the EPA National Eutrophication Survey conducted in 1973-74, the COE Water Quality Management Study conducted in 1978-79, the Georgia DNR Clean Lakes Program Lake Classification Survey conducted in 1980-81, the Georgia DNR Major Lake Monitoring Project conducted from 1984 through 1993, and the Georgia DNR Clean Lakes Water Quality Assessment Study conducted in 1989. The Georgia DNR also maintains two upper-lake ambient monitoring stations: STORET number 12230001, on the Chattahoochee River at Georgia Highway 91; and STORET number 11110001, on the Flint River, 0.8 miles downstream of the Bainbridge State Docks. The data collection record at these stations is from July 1973, to date.

The EPA National Eutrophication Survey report indicated the lake was eutrophic. Carlson trophic state indices from subsequent Georgia DNR studies, generally ranging from 50 to 60, confirm this. The management of nutrient loading is an important long-term objective in maintaining the current water quality.

The lake is shallow with many standing trees and an abundance of macrophytes. These include many nuisance aquatic plants, with Hydrilla being the most prolific. Hydrilla infestation increased from one acre in 1967 to about 24,000 acres (64% of the lake) in 1992. The COE has implemented various aquatic plant management techniques, including aquatic herbicide application and confined grass carp stocking, reducing the current Hydrilla problem to about 14,000 acres. The Georgia 1994-1995 305(b) Report lists portions of Lake Seminole as not fully supporting the designated use of Recreation due to fish consumption guidelines. Fish consumption guidelines are discussed in the following paragraph.

Guidelines for eating fish from Lake Seminole are listed in the following table. This guidance may differ from the guidance issued in the 1994-1995 305(b) Report because of additional samples collected in 1995. The data shown in this table is the new guidance which will be published in the 1997 Georgia Sport Fishing Regulations and 1997 Guidelines for Eating Fish from Georgia Waters booklet. This guidance is based on EPA risk-based management approach and combines historical fish tissue data with data from the 1995 fish tissue collection to produce the new guidance. The guidance is revised each year if new data collected warrant a change.

Fish Consumption Guidelines

Lake Seminole

Species	Less than 12 inches	12-16 inches	Over 16 inches	Chemicals
Largemouth Bass		No Restrictions	No Restrictions	
Channel Catfish		No Restrictions	No Restrictions	
Bullhead	No Restrictions	1 meal per week		Mercury

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Section 6

Concerns and Priority Issues

The assessments in Section 5 present a number of water quality and quantity concerns within the Chattahoochee River basin. This section aggregates the assessment data to identify priority issues for development of management strategies. Water quality and quantity issues are discussed separately, although the connection between quantity and quality should not be overlooked.

6.1 Identified Water Quality Planning and Management Concerns

Section 5 identified both site-specific and generalized sources of water quality stressors. Some issues are limited to specific segments, such as the impact of de-oxygenated water releases from Buford Dam, but a number of water quality concerns apply throughout the basin. The criterion listed most frequently in the 1995 Water Quality Assessment as a contributor to non-supporting or partially-supporting status was fecal coliform bacteria (774 out of 1588 miles, or 49% of the stream miles which were assessed within the basin), followed by metals such as zinc, copper and lead (384 out of 1588 miles, or 24% of assessed stream miles, including waters with violations of standards for both fecal coliform bacteria and metals). Both fecal coliform and metals violations are most often attributed to “urban runoff” as a primary source or one among several sources (531 miles for fecal coliforms, 329 miles for metals), followed by “nonpoint or unknown” sources (266 miles for fecal coliforms, 60 miles for metals). Within some individual stream reaches, other sources may be of greater importance (e.g., CSOs as a source of fecal coliform violations); however, urban runoff and general nonpoint sources represent a basin-wide concern. Further, strong population growth and development pressure in parts of the basin (e.g., Atlanta metro area) will tend to increase the importance of urban runoff as a stressor of concern. For such widespread concerns, basin-wide management strategies will be needed.

Major water quality concerns for the Chattahoochee River basin are summarized by geographic area in terms of the stressors of concern and sources of these stressors in Table 6-1. Table 6-2 summarizes the relationship between specific designated uses and stressors causing lack of full support for those uses.

In the following pages, priority water quality concerns are presented by Hydrologic Unit. As in Section 5, several of the Hydrologic Units are broken down into sub-sections for ease of discussion. Detailed strategies for addressing these concerns are then supplied in Section 7.

Each concern is listed in the form of a “Problem Statement” which summarizes the linkage between stressor sources and water quality impacts. The order in which concerns are listed for each Hydrologic Unit should not be considered to be significant. Prioritization of basin concerns requires consensus among all stakeholders, and has not been finalized; however, short term water quality action priorities for EPD are summarized in Section 6.2. Priorities for addressing water quantity issues within the Chattahoochee basin are being addressed as part of the ACT/ACF study, and are summarized in Section 6.3.

Table 6-1. Summary of Concerns in the Chattahoochee River Basin

Stressor	Source of the Stressor by Sub-Area					
	HUC 03130001 Area A Headwaters to Lake Lanier	**HUC 03130001 Area B Buford Dam to Peachtree Creek**	**HUC 03130002 Area A Peachtree Creek to West Point Lake**	**HUC 03130002 Area B West Point Dam to Columbus**	**HUC 03130003 Columbus to Lake W. F. George**	**HUC 03130004 Lake W. F. George to Lake Seminole**
Metals	nonpoint sources, urban runoff, point source discharges, atmospheric deposition	urban runoff, point source discharges	urban runoff, point source discharges, rural nonpoint sources	urban runoff, point source discharges, rural nonpoint sources, atmospheric depos.	urban runoff, atmospheric deposition	nonpoint sources, atmospheric deposition
Fecal Coliform Bacteria	urban runoff, agriculture, rural nonpoint sources	urban runoff, rural nonpoint sources, CSOs	urban runoff, CSOs, rural nonpoint sources	urban runoff, agriculture, rural nonpoint sources	urban runoff, rural nonpoint sources	
Erosion and Sedimentation	urban runoff, rural roads, forestry, agriculture, construction	urban runoff, nonpoint sources, construction	urban runoff, rural roads, forestry, agriculture, construction	urban runoff, rural roads, forestry, agriculture, construction	urban runoff, rural roads, for-estry,construc-tion, agriculture	
Dissolved Oxygen		dam operation, CSOs, urban runoff		dam operation, urban runoff, nonpoint sources		dam operation
Nutrients	agriculture, urban runoff, point sources		point sources, urban runoff, agriculture		point sources, urban runoff, agriculture	
Synthetic Organic Chemicals		Historic uses, sediment	Historic uses, sediment	Historic uses, sediment	Historic uses, sediment	Historic uses, sediment
Water Temperature		dam operation, urban runoff, point source discharges	dam operation, urban runoff, point source discharges			
Water Quantity	Competing uses	Competing uses				
Aquatic Weeds						Infestation

Table 6-2. Summary of Sources of Lack of Full Support for Classified Uses in the Chattahoochee River Basin

Use Classification of Waterbody Segments	Geographic Area					
	HUC 03130001 Area A Headwaters to Lake Lanier	**HUC 03130001 Area B Buford Dam to Peachtree Creek**	**HUC 03130002 Area A Peachtree Creek to West Point Lake**	**HUC 03130002 Area B West Point Dam to Columbus**	**HUC 03130003 Columbus to Lake W. F. George**	**HUC 03130004 Lake W. F. George to Lake Seminole**
Fishing (Support for Aquatic Life)	metals, erosion, toxicity, impaired biota	metals, dissolved oxygen, erosion, temperature	metals, toxicity, temperature, erosion, dissolved oxygen, impaired biota	metals, dissolved oxygen, erosion, impaired biota	metals, pH, erosion, toxicity	dissolved oxygen
Fishing (Fish Consumption)		synthetic organic compounds, metals	synthetic organic compounds	synthetic organic compounds, metals	synthetic organic compounds, metals	synthetic organic compounds, metals
Fishing (Secondary Contact Recreation)	fecal coliform bacteria, metals	fecal coliform bacteria, metals	fecal coliform bacteria, metals	Fecal coliform bacteria, metals	fecal coliform bacteria	fecal coliform bacteria
Drinking Water		fecal coliform bacteria, erosion	fecal coliform bacteria, impaired biota			
Recreation	fecal coliform bacteria, pH, erosion, nutrients, water quantity	fecal coliform bacteria, dissolved oxygen, erosion, fish consumption guidelines, water quantity	nutrients, fish consumption guidelines	fish consumption guidelines	metals, nutrients, fish consumption guidelines	metals

Problem Statements

Hydrologic Unit 03130001, Area A (Headwaters to Lake Lanier)

A. Metals: The water use classification of fishing was not fully supporting in two Chattahoochee River mainstem segments, in 4 tributary stream segments, and in two areas of Lake Lanier due to exceedences of the water quality standards for metals. Lead, copper, and/or zinc standards were exceeded in the river due to a water pollution control plant discharge in one segment and to nonpoint sources in the second segment; zinc, copper, lead and/or mercury standards were exceeded in tributary streams due primarily to nonpoint sources in three segments and to a water pollution control plant in one segment; and nonpoint sources of lead and mercury were exceeded once each in a different portions of Lake Lanier.

B. Fecal Coliform Bacteria: The water use classification of fishing or recreation was not fully supported in three Chattahoochee River mainstem segments and 30 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes. This area has a high concentration of poultry operations, and spreading of poultry waste on fields may be a potential source.

C. Erosion and Sedimentation: The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment, which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

D. Nutrients: The water use classifications of fishing, drinking water, and recreation are potentially threatened in Lake Lanier due to inputs of nutrients which may cause excess algal growth in the lake. Nutrient sources include water pollution control plant discharges and nonpoint sources from urban and agricultural areas.

E. Water Quantity: Sufficient surface water quantity to meet the competing demands for drinking water, minimum instream flow rate and other environmental releases, hydropower, recreation, and (downstream) navigation uses may not be available within Lake Lanier and the upstream basin.

Hydrologic Unit 03130001, Area B (Buford Dam to Peachtree Creek near Atlanta)

A. Metals: The water use classification of fishing was not fully supported in one segment of the Chattahoochee River and in 11 tributary stream segments due to exceedances of water quality standards for metals primarily in the Atlanta metropolitan area. Lead, copper, and zinc standards were exceeded in the river primarily due to urban runoff and zinc, copper, cadmium, and/or lead standards were exceeded in tributary streams also due primarily to urban runoff.

B. Fecal Coliform Bacteria: The water use classification of fishing was not fully supported in four Chattahoochee River segments and in 30 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, combined sewer overflows, septic systems, sanitary sewer overflows, and rural nonpoint sources.

C. Elevated Water Temperatures: The segment of the Chattahoochee from Buford Dam to Peachtree Creek is designated as a secondary trout water. The cold temperature is largely governed by patterns of release from Buford Dam. The water use classification of fishing is potentially threatened in this segment due to urban runoff from impervious areas, loss of riparian tree canopy, and water pollution control plant discharges. There are no waters currently listed for excursion of temperature standards in this segment of the river.

D. Low Dissolved Oxygen: The fishing water use classification was not fully supported in one segment of the Chattahoochee River and in one tributary segment due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the river segment was due to bottom water discharges from Buford Dam, and in the tributary, Clear Creek, was due to nonpoint sources and combined sewer overflows.

E. Erosion and Sedimentation: The water use classification of fishing is potentially threatened in many segments by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. Currently, there is one stream segment listed in this subbasin as partially supporting designated uses due to poor fish community. Sediment may be a factor influencing the fish community in these segments. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture.

F. Instream Flows: The water use classifications of fishing and recreation are potentially threatened by inadequate instream flows in the Chattahoochee River mainstem.

G. Fish Consumption Guidelines: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem from Buford Dam to Morgan Falls Dam and from Morgan Falls Dam to Peachtree Creek. PCBs, mercury, or chlordane were the cause of consumption guidelines in the upper segment of the river and PCBs caused the guidelines in the lower segment of the river. The guidelines are for rainbow trout, carp, largemouth bass, and yellow perch in the upper segment and for carp in the lower segment.

Hydrologic Unit 03130002, Area A (Peachtree Creek to West Point Lake)

A. Metals: The water use classification of fishing was not fully supported in three segments of the Chattahoochee River and in 15 tributary stream segments due to exceedances of water quality standards for metals primarily in the Atlanta metropolitan area. Lead or copper standards were exceeded in the river primarily due to urban runoff and zinc, copper, cadmium, lead and/or mercury standards were exceeded in tributary streams also due primarily to urban runoff.

B. Fecal Coliform Bacteria: The water use classification of fishing was not fully supported in three Chattahoochee River segments and in 45 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, combined sewer overflows, septic systems, sanitary sewer overflows, and rural nonpoint sources.

C. Nutrients: The water use classifications of fishing, drinking water, and recreation are potentially threatened in West Point Lake due to inputs of nutrients which may cause excess algal growth in the lakes. Nutrient sources are upstream water pollution control plant discharges and nonpoint sources from urban and agricultural areas. Water quality standards are in place to address nutrients in West Point Lake. At this time water quality data indicate compliance with standards.

D. Erosion and Sedimentation: The water use classification of fishing is potentially threatened in many segments, by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. There are 19 stream segments listed in this subbasin as partially supporting designated uses due to poor fish communities. Sediment may be a factor influencing fish communities in these areas. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture.

E. Elevated Water Temperature: The segment of the Chattahoochee from Peachtree Creek to Utoy Creek is designated as a secondary trout water. The water use classification of fishing is not fully supported in this segment due to elevated water temperature associated with wastewater discharges, power plant operation, and urban runoff from impervious areas.

F. Fish Consumption Guidelines: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem or in West Point Lake based on fish consumption guidelines due to PCBs and chlordane in the river segment and PCBs in the lake. The guidelines are for largemouth and striped bass, carp, and channel catfish in the river and for largemouth and hybrid bass, carp, and channel catfish in the lake. The use of PCBs and chlordane are banned in the United States.

Hydrologic Unit 03130002, Area B (West Point Dam to Columbus)

A. Metals: The water use classification of fishing was not fully supported in Long Cane Creek in the LaGrange area and in Goat Rock Lake due to exceedance of the water quality standards for metals. Copper, lead, and zinc standards were exceeded in Long Cane Creek and the copper standard was exceeded in Goat Rock Lake. The metals in Long Cane Creek may be attributed to a combination of effluent from a LaGrange water pollution control plant discharge and urban runoff and in Goat Rock Lake to nonpoint sources. The LaGrange water pollution control plant discharge has been removed from the creek.

B. Fecal Coliform Bacteria: water use classification of fishing was not fully supported in five stream segments in the LaGrange area and three stream segments in rural areas due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combinations of urban runoff, septic systems, sanitary sewer overflows, agriculture, rural nonpoint, and natural sources.

C. Erosion and Sedimentation: The water use classification of fishing is potentially threatened by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. Sediment may be a factor influencing fish communities in these areas. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

D. Low Dissolved Oxygen: The fishing water use classification was not fully supported in one segment of the Chattahoochee River and in two tributary segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the river segment was due to bottom water discharges from West Point Lake and in the tributaries due to nonpoint sources.

E. Fish Consumption Guidelines: The water use classification of fishing was not fully supported in Lake Harding, Goat Rock Lake, and Lake Oliver based on fish consumption guidelines. PCBs and mercury were the cause of consumption guidelines. The guidelines are for largemouth and hybrid bass, channel catfish, crappie, black crappie, catfish, and spotted sucker.

Hydrologic Unit 03130003 (Columbus to Lake W.F. George, including Lake George)

A. Metals: The water use classification of fishing was not fully supported in 11 river tributary stream segments in the Columbus area due to exceedance of the water quality standard for copper. Copper and lead standards were also exceeded in the Chattahoochee River below Columbus. The metals may be attributed to urban runoff.

B. Fecal Coliform Bacteria: The water use classification of fishing was not fully supported in seven stream segments due to exceedances of the water quality standard for fecal coliform bacteria. Elevated fecal coliform bacteria concentrations in the Chattahoochee River (two segments) downstream of Columbus may be attributed to CSOs and urban runoff. Urban runoff is the likely source of violations in four river tributaries in the Columbus area and rural nonpoint sources the source of violations in two tributaries to Lake Walter F. George.

C. Erosion and Sedimentation: The water use classifications of fishing and recreation are potentially threatened in waterbodies by erosion and loading of sediment, which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

D. Nutrients: The water use classification of recreation is potentially threatened in Lake Walter F. George due to inputs of nutrients which may cause excess algal growth in the lake. Potential sources may include municipal or industrial point source discharges or nonpoint sources from urban runoff or agriculture.

E. Fish Consumption Guidelines: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem (Oliver Dam to Chattahoochee County) and in Lake Walter F. George based on fish consumption guidelines. PCBs were the cause of the consumption guidelines in the river and mercury, PCBs, and chlordane caused the guidelines in the lake. The guidelines are for channel catfish in the river and for largemouth bass, hybrid bass, and catfish in the lake.

Hydrologic Unit 03130004 (Lake W. F. George to Lake Seminole)

A. Metals: The water use classification of recreation was not fully supported in one segment of the Chattahoochee River due to exceedance of the water quality standard for lead from nonpoint sources.

B. Low Dissolved Oxygen: The fishing water use classification was not fully supported in a segment of the Chattahoochee River downstream of the dam at Walter F. George due to dissolved oxygen concentrations. The low concentrations of dissolved oxygen are a result of releases of bottom water from the dam.

C. Nuisance Weeds: The water use classifications of fishing and recreation are threatened in Lake Seminole due to the presence of nuisance aquatic plant species.

D. Fish Consumption Guidelines: The water use classification of fishing was not fully supported in Lake Seminole based on fish consumption guidelines due to mercury. The guidelines are for bullhead.

6.2 Short Term Water Quality Action Priorities for EPD

Section 6.1 identifies known priority concerns for which management and planning are needed. Because of limited resources, and, in some cases, limitations to technical knowledge, not all these concerns can be addressed at the same level of detail within the current 5-year cycle of basin management. It is therefore necessary to assign action priorities for the short term based on where the greatest return for available effort can be expected.

Current priorities for action by EPD (1996) are summarized in Table 6-3 and discussed below. These priorities were presented to and discussed with the local advisory committee. In addition, the priorities were presented to the public in stakeholder meetings in Helen, Atlanta, and Columbus in 1996. The priorities were also public noticed and approved by the USEPA as a part of the 303(d) listing process in 1996 and discussed in the report, *Water Quality in Georgia, 1995-1996*.

For many waters, control strategies already planned are expected to result in attainment of designated uses. The majority of EPD resources will be directed to insuring the ongoing pollution control strategies are implemented as planned and water quality improvements are achieved. These waters (see Appendix E) are identified as active 305(b) waters, and are the highest priority waters, as these segments will continue to require resources to complete actions and insure standards are achieved. These stream segments have been assigned priority one.

In addition, in the 1996-1997 time period, a very significant level of effort is being directed to the development of a dynamic water quality model of the Chattahoochee River from Buford Dam to Franklin. During the same time period, EPD is working on a lake modeling project for West Point Lake which in conjunction with the river model will provide EPD with defensible, decision making tools for use in developing TMDLs or watershed pollution control or reduction

Table 6-3. EPD's Short-Term Priorities for Addressing Waters Not Fully Supporting Use

Priority	Type
1	Active 305(b) waters where ongoing pollution control strategies are expected to result in achieving support of designated uses; Active special projects.
2	Segments with dissolved oxygen violations or with multiple data points showing violation of standards for toxic metals.
3	Waters for which government partners are available, including low DO problems associated with dam releases and potential impact from agricultural nonpoint sources
4	Waters for which urban runoff and generalized nonpoint sources have resulted in violations of standards for metals or fecal coliform bacteria.

strategies for the river and the lake. EPD has completed Clean Lakes Phase I Diagnostic-Feasibility Studies for West Point Lake and Lake Walter F. George and adopted site-specific water quality standards. Lake standards were adopted for chlorophyll *a*, nitrogen, phosphorus, pH, fecal coliform, and dissolved oxygen. In addition, annual nutrient loading standards were set for major tributaries. Work continues on a Clean Lakes Phase I Diagnostic-Feasibility Studies for Lake Lanier. Following completion of the study, EPD will propose and adopt specific water quality standards for Lake Lanier and its major tributaries.

The foregoing considerations play a major role in the rationale for prioritization of the waters identified as "303(d) waters" — those waters for which impairment is documented and current enforceable requirements are not expected to lead to attainment of water quality standards. A number of other issues also help forge the rationale for priorities. First, the vast majority of waters on the active 303(d) list are a result of exceedance of the criteria for metals, fecal coliform bacteria, or poor fish communities due to urban runoff or nonpoint sources. At the present time the viability of the standards for metals and the efficacy of the fecal coliform bacteria standard are in question in the scientific community, as described in Section 4.2. Also, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards placing a stream reach or area of a lake on the partial support lists. Section 7 describes action plans to address these problem waters.

Second priority was allocated to segments with multiple data points which showed metals or other toxic substance concentrations in excess of water quality standards and to segments in which dissolved oxygen concentration was an issue.

Third priority was assigned to segments where governmental partners outside EPD may be available to aid in the process of implementing water quality improvements, such as the Corps of Engineers in segments where dissolved oxygen is low below a dam, or the Georgia Soil and Water Conservation Commission (designated lead agency for agriculture) in segments potentially impacted by nonpoint sources from agricultural practices. It should be noted that few waters are marked as third priority in the 1994-95 water quality assessment (see Appendix E) as it will take some time for the Georgia Soil and Water Conservation Commission to review the active 303(d) waters and make comparisons to the list of potential agricultural problem areas and provide input on areas that are indicated on both lists.

Due to the concerns over quality of the monitoring data and application of water quality standards for metals and fecal coliform bacteria, fourth priority in the short term was assigned to active 303(d) segments where urban runoff and general nonpoint sources caused metal or fecal coliform bacteria standards violations (see tables in Section 5). Within the current round of basin planning these sources of stressors will be addressed primarily through general strategies of encouraging best management practices for control of stressor loading.

Longer term priorities for water quality management will need to be developed by EPD and all other stakeholders during the next iteration of the basin management cycle.

6.3 Priorities for Water Quantity Concerns

Section 5 also identified a number of concerns for water quantity in the Chattahoochee basin, including existing problems with minimum instream flows and potential future problems for competing future demands on water quantity. The Chattahoochee River basin includes much of the Atlanta Metropolitan Area, as well as the city of Columbus. Thus, the Chattahoochee basin contains a very large portion of the State's total M&I demand. In contrast, the basin's agriculture water needs are small (see Section 3.2.2). The upper basin, above Atlanta, is the site of the State's largest reservoir, Lake Lanier. Lanier is both an important producer of hydropower and one of the most heavily visited Corps of Engineers recreation lakes in the United States; there is also a major investment in home sites on the lake, with a consequent interest in stable lake water levels. West Point Lake and Lake Walter F. George are also major producers of hydropower and West Point is also a significant location for recreation and home ownership. The Chattahoochee river is maintained for navigation as far north as Columbus.

Priorities for Competing Demands

With regard to the priority to be placed on meeting competing demands for future water use, the Environmental Protection Division (in conjunction with a broad group of stakeholders from north, central, and southwest Georgia) has established a set of "guiding principles" which will be followed in developing the state's position regarding the allocation of water among the states of Alabama, Florida, and Georgia. These principles are partially based upon the prioritization given to meeting categories of water needs under Georgia law (i.e., municipal needs are the first priority, and agricultural water needs are second; all other water needs follow these two). The principles are summarized below:

1. Municipal demands have the highest priority.

2. Agriculture needs must be satisfied.

3. Minimum instream flow rates must be met in order to preserve water quality.

4. If other demands (e.g., industrial, recreation, hydropower, navigation, and environment) can not be met under conditions of water shortage, efforts will be made to optimize the mix of economic and environmental values.

While these "guiding principles" were specifically developed to give expression to Georgia's water needs priorities in those areas of Georgia within the study area of the Alabama-Coosa-Tallapoosa/Apalachiocola-Chattahoochee-Flint Comprehensive Study, it is likely that they characterize water needs priorities throughout the state. Thus, Georgia places highest value on the use of water for its citizens to use in drinking and water for agricultural needs. It is also extremely important to address needs for sufficient instream flows to maintain acceptable quality of aquatic habitat.

The Interstate Compact which has been drafted by the states and Federal government for the ACF basin does not give the Commission power to determine how Georgia must allocate its share of available water among competing uses; that decision, and the mechanism to implement that allocation, is left to the Environmental Protection Division. Of course, the larger Georgia's share of the available water resource in these basins, the less often any single demand will not be met.

Regional Water Supply Options

In managing Georgia's surface waters, EPD's approach is to meet as many of the identified water needs to the highest extent practicable, while minimizing adverse impacts associated with meeting those needs. Of foremost importance in meeting those needs is maximizing use of already developed water resources along with aggressive water conservation.

Expected sizeable population growth in the upper reaches of the Chattahoochee basin over the next several decades is likely to result in exhaustion of the water supplies available from already developed sources, even with the employment of very aggressive water conservation measures. New sources will have to be identified and developed. As the population of county and sub-county political jurisdictions in the Chattahoochee River basin continues to expand, the need for water resources is likely to grow beyond the capability of single political jurisdictions to meet demand from the water resources within their political boundaries. Currently available regional sources in the upper Chattahoochee basin (e.g., Lake Sidney Lanier) will also likely be found to have real limits in providing the water resources to meet portions of the expected increases in water demand. Economic growth may be limited by the capabilities of existing local and regional water resources. An alternative strategy is cooperative efforts among adjoining political jurisdictions to plan and construct larger water resources projects. This type of approach would minimize the number of smaller water resources projects, and encourage development of new regional water resources in a more cost-effective and environmentally sensitive manner. Such an approach will require much more inter-jurisdictional cooperation on water supply issues than has been evident to date. Failure to pursue such increased cooperation might very well result in unacceptable water supply based restrictions on regional growth.

6.4 Priorities for Additional Data Collection

In the 1996-97 time frame monitoring efforts are focused on work to support the Chattahoochee River Modeling Project and modeling projects for West Point and Allatoona Lakes as well as on listed priority waters in the Coosa, Oconee, and Tallapoosa river basins in accordance with EPD basin planning schedule. Intensive monitoring will return to the Chattahoochee basin in support of the next iteration of the basin planning cycle in 2000. Prior to this time, EPD and partners will develop a strategic monitoring plan for the Chattahoochee, documented through a written monitoring plan. The monitoring plan will have two major components: general assessment of water quality status within the basin, and targeted assessment to address priority issues and concerns.

The general assessment component will be a continuation of Georgia's ongoing Section 305(b) Use Support Status Monitoring. Key aspects include:

- Expansion of biomonitoring (RBMP and IBI) efforts as an effective, integrative measure of net impacts on water bodies and actual existence of adverse impacts on biota
- Cooperation with WRD and other agencies to develop additional measures of health of aquatic ecosystems
- Expanded toxic substances monitoring associated with drinking water intakes. Where possible, Safe Drinking Water Act funds and community systems would pay for this sampling as is required under the 1996 amendments to the Act.

Targeted Monitoring is designed to address specific areas of concern. Different types of monitoring and assessment techniques can be targeted at different areas depending on identified concerns. For instance, Rapid Bioassessment Protocol (RBMP) monitoring coupled with physical/ chemical monitoring can be conducted to evaluate status of impaired waters and impacts from BMP or other control strategy implementation. The basin planning team should work to develop specific management goals and select environmental indicators useful for addressing these goals for identified concerns. Recommendations for specific targeted monitoring needs are incorporated into Section 7 Implementation Strategies, and will be expanded upon as a monitoring plan for the Chattahoochee basin is developed.

For both components of monitoring, EPD may be able to increase coverage and effectiveness through use of additional external monitoring sources. Areas currently under consideration by EPD include:

- Better coordination of monitoring efforts among partners (agencies, governments, universities, etc.) within the RBMP framework.
- Development of monitoring consortiums to increase efficiency of monitoring by EPD partners.
- Encouraging extension of the Adopt-a-Stream network to identify areas of concern and to work with local governments to resolve identified issues such as stream bank protection, trash, or other aesthetic impairments.

Section 7

Implementation Strategies

The Statement of Mission for Georgia's River Basin Management Planning (see Figure 1-1) is:

> To develop and implement a river basin planning program to protect, enhance, and restore the waters of the State of Georgia, that will provide for effective monitoring, allocation, use, regulation, and management of water resources.

Associated with this mission are a variety of goals which emphasize coordinated planning to meet all applicable local, state, and federal laws, rules, and regulations, and provide for water quality, habitat, and recreation. For the Chattahoochee basin, these goals will be implemented through a combination of a variety of general strategies, which apply across the basin and across the state, and targeted or site-specific strategies. Section 7.1 describes the general and basin-wide implementation strategies of most relevance to the Chattahoochee River basin management plan. Targeted strategies for specific priority concerns within each sub-basin, as identified in Section 6, are then presented in Section 7.2.

7.1 General/Basin-Wide Management Strategies

7.1.1 General Surface Water Protection Strategies

Antidegradation

The State of Georgia considers all waters of the State as high quality and applies a stringent level of protection for each waterbody. Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03(2)(b) contains specific antidegradation provisions as follows:

> (b) Those waters in the State whose existing quality is better than the minimum levels established in standards on the date standards become effective will be maintained at high quality ; with the State having the power to authorize new developments, when it has been affirmatively demonstrated to the State that a change is justifiable to provide necessary social or economic development and provided further that the level of treatment required is the highest and best practicable under existing technology to protect existing beneficial water uses. Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. All requirements in the Federal Regulations, 40 C.F.R. 131.12, will be achieved before lowering of water quality is allowed for high quality water.

The antidegradation review process is triggered at such time as a new or expanded point source discharge is proposed that may have some effect on surface water quality. Such proposals are reviewed to determine if the new discharge is justifiable to provide necessary social or economic development and that the level of treatment required is the highest and best practicable under existing technology to protect existing beneficial water uses.

Applicants for new or expanded point source discharges into any surface water must perform an alternative analysis comparing the proposed discharge alternative to a "no-discharge" land application or urban reuse alternative. The application for discharge to surface waters will only be considered if the less degrading alternatives are determined to be economically or technically infeasible. In all cases, existing instream water uses and the level of water quality necessary to protect the existing use shall be maintained and protected.

Water Supply Watershed Protection Strategy

EPD is acting in concert with the Department of Community Affairs to produce a set of "guidelines" which define, among other things, measures that local governments are encouraged to take to protect drinking water sources. The "guidelines" are entitled Rules for Environmental Planning Criteria, and establish environmental protection criteria for five environmental categories: water supply watersheds, groundwater recharge areas, mountains, river corridors and wetlands. The Criteria for Watershed Protection (a sub-section of the Rules for Environmental Planning Criteria) set minimum guidelines for protection of watersheds above "governmentally owned" water supply intakes. The degree of protection depends upon the size of the watershed; watersheds with drainage areas of less than 100 square miles are subject to more strict criteria as summarized below:

- Impervious surface densities limited to 25% over the entire watershed.
- Buffer/setback requirements equal to 100/150 feet within seven (7) mile radius of the intake and 50/75 feet outside the seven (7) mile radius; and
- A reservoir management plan (including 150 foot buffer around the perimeter of the reservoir).

Watersheds with drainage areas of 100 square miles or more are subject to less strict criteria as summarized below:

- An intake on a flowing stream (as opposed to being located within a reservoir) shall have no specified minimum criteria; and
- An intake with a water supply reservoir shall have a minimum of 100 feet natural buffer within a seven mile radius of the reservoir, and no impervious cover constructed within a 150 foot setback area on both banks of the stream.

As population continues to dramatically increase within the Chattahoochee River basin, it will become ever more important to protect the water quality of already developed raw water sources. It is therefore necessary and appropriate to prepare and implement water supply watershed protection plans for each water supply watershed of 100 square miles or less within the Chattahoochee River basin.

Development of A Series of Watershed Protection Templates

Through funding provided by EPA under the provisions of the 1996 Amendments to the Safe Drinking Water Act, EPD will hire one or more consulting firms to study the morphological characteristics of a yet to be determined number of water supply watersheds in Georgia, and develop suites of non-structural (e.g., land use decisions) and structural (e.g., wet detention ponds) measures that might be employed in each of these watersheds to protect the integrity of the raw water at the current or future surface water sources. The watersheds selected for study will capture a broad range of watershed characteristics (e.g., soil types, current and expected land use patterns, average slope of the watershed). When the studies are completed, the results will be evaluated and integrated to develop a set of water supply watershed protection templates that would be used to assist local governments with developing protection plans for their water supply sources.

Implementation of Provisions of 1996 Amendments to Safe Drinking Water Act

The 1996 Amendments to the Safe Drinking Water Act set a target of development of Source Water Assessment Plans (SWAP) and implementation of Source Water Protection plans (SWP) for 60 percent of the state's population by 2004. The SWAPs will essentially identify the more likely sources of contamination of the water supply in the watershed, and the SWPs will define a watershed-wide strategy for prevention (or minimization) of contamination. EPD is developing a strategy for realizing this target. While development of this strategy is in its infancy, the most crucial element of the implementation of the strategy will be extensive work with watershed-specific focus groups.

Total Maximum Daily Loads

Section 303(d) of the Clean Water Act (CWA) establishes the TMDL, or total maximum daily load, process as a tool to implement water quality standards. Georgia is required by the CWA to identify and list waterbodies where water quality standards are not met following the application of technology based controls, and to establish TMDLs for the listed stream segments. The U.S. Environmental Protection Agency (EPA) is required to approve or disapprove Georgia's 303(d) list of waters and TMDLs.

The most recent requirement for 303(d) list submittal occurred in 1996. Georgia submitted a draft 303(d) list to the USEPA in February 1996. The EPA reviewed the Georgia submittal and provided comments in March, 1996. Georgia submitted a final 303(d) listing to the EPA on April 1, 1996. The EPA approved the Georgia 303(d) list on May 2, 1996.

Georgia's 1996 303(d) listing is based on the Georgia 305(b) water quality assessments. The 305(b) assessment is presented in the report *Water Quality in Georgia, 1995-1996*. The 305(b) assessment tables are reprinted in Appendix E of this report. The tables provide a code indicating the 303(d) listing status of assessed segments within the Chattahoochee River basin. An explanation of the codes is given below. An "X" in the 303(d) column indicates the segment is on the Georgia 303(d) list.

1 Segments identified as not supporting or partially supporting designated uses where actions have been taken and compliance with water quality standards achieved. These segments are not part of the Georgia 303(d) list.

2 Segments identified as not supporting or partially supporting designated uses where existing enforceable State, local, or Federal requirements are expected to lead to attainment of water quality standards without additional control strategies. These segments are not part of the Georgia 303(d) list.

X Waters with active 303(d) status. These segments are assessed as not supporting or partially supporting designated uses, and may require additional controls to achieve designated uses. These segments make up the Georgia 303(d) list.

NA Waters assessed as supporting designated uses.

Georgia will address a number of the listed waters in the 1997-1998 time period, however, the majority of work on segments in the Chattahoochee River will be addressed in the second round of basin planning. The second round of basin planning for the Chattahoochee River will begin in 1999 and the river will be the focus of monitoring in the year 2000. Significant efforts will be made to assess the condition of the listed 303(d) waters at that time and results of the assessments will dictate the areas where TMDLs will be developed.

7.1.2 Management of Permitted Point Sources

The strategies in this section strive to minimize adverse effects from municipal, industrial, and concentrated stormwater discharges. Permitted discharges of treated wastewater are managed via the National Pollutant Discharge Elimination system (NPDES) permit program. The NPDES permit program provides a basis for regulating municipal and industrial discharges, monitoring compliance with effluent limitations, and initiating appropriate enforcement action for violations. EPD has formulated general strategies for a number of types of environmental stressors under the NPDES program.

Analysis of Alternatives

Applicants for new or expanded point source discharges into any surface water must perform an alternative analysis comparing the proposed discharge alternative to a "no discharge", land application or urban reuse alternative. The application for discharge to surface waters will only be considered if the less degrading alternatives are determined to be economically or technically infeasible. In all cases, existing instream water uses and the level of water quality necessary to protect the existing use shall be maintained and protected.

Permit Issuance/Reissuance Strategies

During the basin plan implementation phase, issues identified in the written basin plan pertaining to point source discharges will be assessed. The assessment will include such things as 1) identified point source discharge problem areas, 2) data evaluations, 3) wasteload allocations and/or TMDLs with identified problem point sources, and 4) toxics identified with point source discharges. Permits associated with identified problems will be evaluated to determine if a reopening of the permit is appropriate to adequately address the problem.

Facility Construction/Improvements

EPD has promoted continuing improvement in the quality of return flows from permitted point sources in the basin. Upgrading wastewater treatment facilities is a significant strategy to meet effluent limits from discharges. In the past ten years, various upgrades and improvements have been made to industrial and municipal treatment systems throughout the Chattahoochee River basin. The funding for these projects has come from state and federal construction grants and the citizens of local municipalities. Appendix C provides detailed information on expenditures by city and county governments on upgrading wastewater treatment facilities.

Domestic Wastewater Systems

The collecting, treating and disposing of wastewater in Georgia is regulated by a number of environmental laws that are administered by various agencies in local and state government. When a local government or private concern (owner) identifies a need for a wastewater treatment and disposal system it is imperative that thorough and adequate planning take place. Wastewater systems that discharge treated wastewater to a surface stream must be permitted through the federal National Pollution Discharge Elimination System (NPDES) and meet all the requirements of that system. In Georgia, with very few exceptions, surface discharge permits will only be issued to publicly owned systems.

Wastewater systems that do not result in a discharge to surface waters, such as slow rate land treatment systems and urban reuse systems (no discharge), are permitted through the State of Georgia's land application system (LAS) permitting process. Both publicly and privately owned systems can apply for and receive LAS permits.

Chlorine

If a chlorine limit is not already required in an NPDES permit, all major municipal wastewater facilities (i.e., those with design flows greater than or equal to 1.0 million gallons per day [MGD]) are required to meet a chronic toxicity-based chlorine limitation when the permit comes up for routine reissuance. The limitation is calculated based on a maximum instream concentration of 0.011 mg/l, the facility's design flow, and the 7Q10 low flow of the receiving stream. No facilities are given a limitation higher than 0.5 mg/l as this is deemed to be an operationally achievable number even if a facility does not have dechlorination equipment installed. Facilities which are given a limitation more stringent than 0.5 mg/l which do not already have dechlorination equipment installed, are given up to a two year schedule in which to meet the limitation. All discharging facilities which are upgrading are required to meet a chlorine limitation as part of the upgrade, based on the same criteria noted above.

Ammonia

Ammonia in effluents poses a problem both as a source of toxicity to aquatic life and as an oxygen-demanding waste. New facilities and facilities proposed for upgrade are required to meet ammonia limits for toxicity if those limits are more stringent than instream dissolved oxygen based limits. Existing facilities are not be required to meet ammonia limits based on calculated toxicity unless instream toxicity has been identified through toxicity testing.

Metals/Priority Pollutants

Major municipal and industrial facilities are required to submit periodic priority pollutant scans to EPD as part of their permit monitoring requirements or upon submittal of a permit application for permit reissuance. The priority pollutant data is assessed in accordance with the Georgia Rules and Regulations for Water Quality Control. The results of the assessment can be used to trigger either additional priority pollutant monitoring, a toxicity reduction evaluation or permit limits for certain parameters.

Color

The State's narrative water quality standard for color requires that all waters shall be free from material related to discharges which produce color which interferes with legitimate water uses. EPD's color strategy will address this standard for industrial and municipal discharges by implementing permit limits and/or color removal requirements. EPD requires new facilities or discharges to prevent any noticeable color effect on the receiving stream. EPD requires existing facilities with color in their effluent to collect upstream and downstream color samples when their NPDES permit is reissued. The facility must conduct an assessment of the sources of color. Also, a color removal evaluation may be required at permit reissuance. EPD will also target facilities for color removal requirements based on significant citizen complaints of discoloration in streams.

Phosphorus

Almost all major municipal NPDES facilities between Buford Dam and West Point Lake, are required to meet a phosphorus limitation of 0.75 mg/l monthly average. All of the major facilities in this stretch of the river are meeting these limitations. The City of Atlanta water pollution control plants are required to meet a monthly average phosphorus limitation of 0.64 mg/l as a discharge average from their three plants in this stretch of the river starting February 1, 1997. Each of the these facilities will have to individually meet the 0.64 mg/l limitation by January 1, 2001. Also, four facilities in this stretch of the river have design flows of less than 1.0 MGD and greater than or equal to 0.5 MGD. During late 1996 and 1997, each of these four facility's permits are coming up for reissuance. Each facility has been, or will be, required to meet the 0.75 mg/l monthly average phosphorus limitation within two years of the issuance date of each respective permit.

Temperature

Permits issued for facilities which discharge to primary trout streams are required to have no elevation of natural stream temperatures. Permits issued for facilities which discharge to secondary trout streams are required to not elevate the receiving stream more than 2 degrees Fahrenheit.

Stormwater Permitting

The 1987 Amendments to the federal Clean Water Act require permits to be issued for certain types of stormwater discharges, with primary focus on stormwater runoff from industrial operations and large urban areas. The USEPA promulgated Storm Water Regulations on November 16, 1990. EPD subsequently received delegation from the USEPA in January 1991 to issue General Permits and regulate storm water in Georgia. EPD has developed and implemented a stormwater strategy which assures compliance with the federal regulations.

The “Phase I” Federal Regulations set specific application submittal requirements for large (population 250,000 or more) and medium (population 100,000 to 250,000) municipal separate storm sewer systems. Accordingly, Georgia has issued individual area-wide NPDES municipal separate storm sewer system (MS4) permits to 58 cities and counties in municipal areas with populations greater than 100,000 persons. These permits authorize the municipalities to discharge storm water from the MS4s which they own or operate, and incorporate detailed storm water management programs. These programs may include such measures as structural and non-structural controls, best management practices, inspections, enforcement and public education efforts. Storm water management ordinances, erosion and sediment control ordinances, development regulations and other local regulations provide the necessary legal authority to implement the storm water management programs. Illicit discharge detection and long-term wet weather sampling plans are also included in the management programs. The permit requires the submission of Annual Reports to EPD, describing the implementation of the storm water management program.

EPD has determined that the metropolitan Atlanta area is a large municipal system as defined in the regulations. Clayton, Cobb, DeKalb, Fulton, and Gwinnett Counties and all interlying incorporated cities are required to comply with the application submittal target dates for a large municipal area. Forty-five stormwater permits were issued to the Atlanta area municipalities on June 15, 1994.

The City of Columbus and surrounding area has been identified as a medium municipal system as defined in the storm water regulations. A stormwater permit was issued on April 20, 1995.

The stormwater permits for large and medium municipal systems require annual reports to be submitted starting one year after the permit issuance. During 1995, the Georgia stormwater permitting program included EPD review of the first Annual Reports from each of the 45 Atlanta area municipalities. Among other things, the Annual Report includes a detailed description of the municipality's implementation of its Storm Water Management Plan.

The Atlanta Regional Commission (ARC) provides a variety of services related to stormwater management to the area cities and counties surrounding Atlanta. The ARC coordinated and facilitated the application process for the 45 NPDES municipal separate storm sewer system (MS4) permits which were issued by EPD to the Atlanta-area municipalities in 1994. The ARC provided (and continues to provide) a variety of services to area cities and counties, including rainfall analysis, land use characterization, mapping services and storm water management program guidance. In addition, the ARC organized and coordinated the storm water discharge characterization sampling and modeling efforts for the permit applications, and currently facilitates area storm water management through its activities with the Atlanta Region Storm Water Management Task Force, coordination of the Atlanta Regional Storm Water Sampling Program and publication of guidance documents. (Note: The ARC should be contacted directly regarding its involvement with land use planning, water quality monitoring, development of a water quality index and other work relevant to the basin planning process.)

EPD has issued one general permit regulating storm water discharges for 10 of 11 Federally regulated industrial subcategories defined in the Phase I Federal regulations. The eleventh subcategory, construction activities, will be covered under a separate general permit. The general permit for industrial activities requires the submission a Notice of Intent (NOI) for coverage under the general permit, the preparation and implementation of a storm water pollution prevention plan, and in some cases, the monitoring of storm water discharges from the facility. As with the municipal storm water permits, implementation of site-specific best management practices is the preferred method for controlling storm water runoff.

Currently there are 589 facilities in the Chattahoochee River Basin that have submitted NOIs for coverage under the general permit for storm water discharges associated with industrial activities. As with the municipal systems, implementation of Phase II of Federal storm water permitting is expected to result in a greater number of facilities becoming regulated to control storm water runoff. However, the specific types of industrial, commercial and retail activities which will be addressed under Phase II have yet to be determined.

7.1.3 Nonpoint Source Management

The strategies in this section address sources of environmental stressors which are not subject to NPDES permitting and typically originate from diffuse or nonpoint sources associated with land uses. Most strategies that address nonpoint source concerns are not regulatory in nature, but involve a variety of approaches such as technical assistance and education to prevent and reduce nonpoint source pollution in the basin. Strong stakeholder involvement will be essential to effectively implement many of these strategies.

Georgia Nonpoint Source Management Program

The Georgia Environmental Protection Division (EPD) is currently revising and updating the Georgia Nonpoint Source Management Program. The Georgia Nonpoint Source Management Program will provide an overview of the State's nonpoint source water quality management activities as well as a summary of what the State intends to accomplish in the next five federal fiscal years (FFY 1998 - FFY 2002). As outlined in the Clean Water Act, the State is only eligible to receive financial assistance under Section 319(h) for program implementation if the Georgia Nonpoint Source Management Program has been approved by the United States Environmental Protection Agency (USEPA).

EPD has contracted with the University of Georgia - Institute of Community Affairs and Development to assist in revising and updating the Georgia Nonpoint Source Management Program. A final draft of the Georgia Nonpoint Source Management Program will be submitted to the USEPA for review and approval in September, 1997.

During the initial phase, UGA - ICAD faculty will develop a composite inventory of nonpoint source pollution management activities at EPD and selected cooperating agencies. This inventory will be developed through a review of available documentation and series of site visits and interviews. An objective of this project is to compile information on both current nonpoint source pollution management activities and goals and activities anticipated over the next five years, FFY 1998 - FFY 2002, (including statewide and watershed-specific programs).

Once approved, the Georgia Nonpoint Source Management Program will address the following:

- Agriculture
    - Non-irrigated crop production
    - Irrigated crop production
    - Specialty crop production (e.g., truck farming and orchards)
    - Pasture land
    - Range land
    - Feedlots - all types
    - Aquaculture
    - Animal holding/management areas
- Silviculture
    - Harvesting, reforestation, residue management
    - Forest management
    - Road construction/maintenance
- Construction
    - Highway/road/bridge
    - Land development
- Urban Runoff
    - Storm sewers (source control)
    - Combined sewers (source control)
    - Surface runoff
- Resource Extraction/Exploration/Development
    - Surface mining
    - Subsurface mining
    - Placer mining
    - Dredge mining
    - Petroleum activities
    - Mill tailings
    - Mine tailings
- Land Disposal (Runoff/Leachate from Permitted Areas)
    - Sludge
    - Wastewater
    - Landfills
    - Industrial land treatment
    - On-site wastewater systems (septic tanks, etc.)
    - Hazardous waste
- Hydrologic/Habitat Modification
    - Channelization
    - Dredging
    - Dam construction
    - Flow regulation/modification
    - Bridge construction
    - Removal of riparian vegetation
    - Streambank modification/destabilization

Other
- Atmospheric deposition
- Waste storage/storage tank leaks
- Highway maintenance and runoff
- Spills
- In-place contaminants
- Natural

Local governments will be provided a copy of the Georgia Nonpoint Source Managment Program following USEPA approval.

Agricultural Nonpoint Source Control Strategies

Agricultural nonpoint source pollution continues to be managed and controlled with a statewide non-regulatory approach. This approach uses cooperative partnerships with various agencies and a variety of programs. A brief description of these agencies and outline of their functions and programs is provided below.

Georgia Soil and Water Conservation Commission (GSWCC). Created in 1937 by an Act of the Georgia Legislature, the GSWCC has been designated as the administering or lead agency for agricultural nonpoint source pollution prevention in the state. The GSWCC develops NPS water quality programs and conducts educational activities to promote conservation and protection of land and water resources devoted to agricultural uses. Primary functions of the GSWCC are to provide guidance and assistance to the Soil and Water Conservation Districts and provide oversight for the Georgia Erosion and Sedimentation Act. There are 6 regional offices and 40 local districts in the states. The initial contact for the GSWCC is F. Graham Liles, Jr., Executive Director, P.O. Box 8024, Athens, GA 30603, (706) 542-3065.

Soil and Water Conservation Districts (SWCDs). Georgia's SWCDs were also formed by Act of the Georgia General Assembly in 1937. Georgia's SWCD's receive no annual appropriations and are not regulatory or enforcement agencies. Their role is to provide leadership in the protection, conservation, and improvement of Georgia's soil, water, and related resources. This is accomplished through promotion efforts related to the voluntary adoption of agricultural best management practices (BMPs).

Currently, there are forty active SWCD's in Georgia, eleven of which are in the Chattahoochee River Basin. At the county level, each SWCD receives technical assistance, via an existing Memorandum of Agreement, from the United States Department of Agriculture's Natural Resources Conservation Service to work with landowners on implementing agricultural BMPs. Through these partnerships, applying a voluntary approach to conservation, 15 million acres have received conservation treatment in Georgia. The initial contact for the SWCDs is the same as for the GSWCC.

U. S. Department of Agriculture's Natural Resources Conservation Service (NRCS). The NRCS (formerly known as the Soil Conservation Service or SCS) cooperates with federal, state, and local units of government to provide technical assistance to landowners, cooperators, producers, and special interest groups. Standards and specifications regarding conservation practices, animal waste management systems, grazing activities, plant materials, and other practices are developed and revised by a varied staff. The initial contact for the NRCS is United States Department of Agriculture, Natural Resources Conservation Service, Earl Cosby, State Conservationist, 355 Hancock Avenue, Athens, Georgia, (706) 546-2272.

University of Georgia's College of Agricultural and Environmental Sciences (CAES). The CAES includes various departments, the Cooperative Extension Service, and Experiment

Stations. Services provided include classroom instruction in agriculture-related topics; basic and applied research; consultative assistance; and information on nonpoint-related impacts on water quality; water quality monitoring; pest control; and analyses of nutrients, pesticides, herbicides, and other constituents in forage, water, and animal waste. Nutrient management plans for farms are often developed by CAES.

Farm Services Agency (FSA). The FSA, formerly known as the Consolidated Farm Services Agency (CFSA) and the Agricultural Stabilization and Conservation Service (ASCS), administers conservation cost-sharing and incentive programs for practices that improve environmental quality on farms. A variety of water quality improvement practices are cost-shared, with rates generally between 50 and 70 percent of the total cost of the installation. A large portion of funds allocated are targeted for high-priority watersheds with water quality problems. The initial contact for the FSA is Mr. Bobby Duncan, Acting State Director, Farm Services Agency, 355 East Hancock Avenue, Athens, GA 30601, (706) 546-2266.

Georgia Department of Agriculture (GDA). The GDA administers a variety of insect and plant and animal disease control programs. The Department also enforces myriad Georgia laws that include inspections of agricultural products and the registration and use of pesticides. The GDA also provides guidance in location of animal waste facilities and disposal of dead animals. The initial contact for the GDA is The Honorable Tommy Irvin, Commissioner, 204 Agriculture Building, Capitol Square, Atlanta, GA 30334, (404) 656-3600.

Agricultural Research Service (ARS). As part of the U. S. Department of Agriculture (USDA), the ARS is involved in a wide variety of agricultural research projects and monitoring programs. Research on grazing land systems and irrigation methods relevant to watershed-scale monitoring projects and nutrient movement in surface water and groundwater are examples of work performed by the ARS. The initial contact for the ARS is Dr. Jean Steiner, Director, 1430 Experiment Station Road, Watkinsville, GA 30677, (706)-769-8962.

Resource Conservation and Development (RC&D) Councils. RC&D councils are groups of local citizens that are involved in a program to encourage economic development, as well as the wise conservation of natural and human resources. The RC&D Councils are locally organized within geographic regions served by the USDA. The 1962 Food and Agriculture Act established the RC&D Council program with USDA employees called coordinators assigned to help the RC&D Councils. Currently, there are 10 RC&D Councils in Georgia. Initial contact for RC&D Councils is The Honorable Jeanette Jamieson, President, Georgia RC&D Council, P.O. Box 852, Toccoa, GA 30577 (706) 886-6889.

The federal and state agencies work closely with the Georgia agricultural commodity commissions and organizations such as the Farm Bureau Federation, AgriBusiness Council, Cattleman's Association, Milk Producers, Pork Producers Association, Poultry Federation, and other producer groups and agriculture support industries to control, prevent, and/or abate nonpoint source pollution.

The agricultural community has been participating with EPD in project activities designed to demonstrate agricultural best management practices (BMPs) through Section 319 of the Federal Clean Water Act. These demonstration projects act as a forerunner to Federal agricultural programs charged with getting conservation measures, or BMPs, installed within designated priority areas. The Cooperative Extension Service also works with landowners, through their Sustainable Agriculture & Farm-A-Syst Programs, to promote conservation measures, BMPs, and other appropriate cultural practices designed to foster agricultural production using environmentally sound techniques.

Georgia's Soil and Water Conservation Districts, with assistance from the Natural Resources Conservation Service and the Farm Services Agency, work with landowners on the implementation of conservation measures and BMPs. The 1996 Farm Bill has enhanced and diversified the delivery of conservation programs in Georgia. It is anticipated that the Farm Bill delivery process will provide opportunities for all types of agricultural production to qualify for cost-share incentives to voluntarily implement BMPs, which will include, but not be limited to, conservation cropping sequence; conservation tillage practices; contour farming; grassed waterways; and terracing. A NRCS State Technical Committee, comprised of natural resource professional with diverse technical expertise and representing a number of State and Federal agencies, is now being utilized to identify priority resource concerns and geographic areas across the State. Conservation Programs available to address priority resource concerns include, but are not limited to: the existing Conservation Reserve Program (CRP), which protects highly erodible and environmentally sensitive land with grass, trees, and other long-term cover; the Wetland Reserve Program (WRP), a voluntary program designed to protect, restore, and enhance wetlands with cost-share incentives; and the Wildlife Habitat Incentives Program [WHIP], which will help landowners develop and improve habitats for upland wildlife, wetland wildlife, endangered species, fisheries, and other wildlife. Other programs include the Forestry Incentives Program (FIP), the Farmland Protection Program, and the newly created Environmental Quality Incentives Program (EQIP), which encompasses the old Agricultural Conservation Program and Water Quality Incentives Program, and is discussed further below. Collectively all of these programs will continue to have a significant and positive impact on Georgia's natural resources.

Environmental Quality Incentives Program

The 1996 Farm Bill created a new flagship conservation program, the Environmental Quality Incentives Program (EQIP), which will provide the lion's share of funding for technical, educational, and financial assistance for the implementation of agricultural best management practices. The NRCS has leadership for EQIP and works with the Farm Service Agency (FSA) to set policies, priorities, and guidelines. These two agencies take recommendations from local work groups and the State Technical Committee (discussed in the previous paragraph) when addressing actual, and potential, resource impairments associated with agricultural land uses.

EQIP provides incentive payments and cost-sharing for conservation practices through 5 - 10 year contracts. Producers may receive federal cost-sharing up to 75 percent of the average cost of certain conservation practices such as terraces, grassed waterways, filter strips, buffer strips, manure management facilities, animal waste utilization, and 46 other conservation practices important to improving and maintaining the health of natural resources in an area. An individual producer can receive as much a $50,000 in EQIP funds to implement needed conservation practices.

A majority of funds allocated to Georgia (65 percent) will be spent in priority areas where there are serious and critical environmental needs and concerns. High priority is given to areas where state and local governments offer financial and technical assistance, and where agricultural improvements will help meet water quality and other environmental objectives. None of the priority areas are in the Chattahoochee River basin.

The remaining 35 percent of funds allocated to Georgia can be extended outside priority areas to other parts of the state. Eligibility is limited to persons who are engaged in agricultural productions. Eligible land includes crop land, pasture land, forest land, and other farm lands.

Shown in Table 7-1 is the estimated Financial Assistance (FA), Educational Assistance (EA), and Technical Assistance (TA) that will be available to producers during the 1997 FFY in the Chattahoochee River basin. Local NRCS and FSA offices will have 3 - 5 years for obligating this year's allocation to eligible producers.

Forestry Nonpoint Source Control Strategies

In 1977, the Governor's Silviculture Task Force prepared a report which recommended a voluntary approach to the implementation of best management practices (BMPs) and the designation of the **Georgia Forestry Commission (GFC)** as the lead agency for implementing the Silviculture portion of the State Section 208 Water Quality Management Plan. The GFC was designated as the lead agency for silvicultural nonpoint source pollution prevention in the state in November, 1979. The Forestry Nonpoint Source Control Program is managed and

Table 7-1. Chattahoochee River Basin Agricultural BMPs-General Appropriations under EQIP for FFY 1997

	Resource Concerns ($)			
	Water Quality	**Soil Erosion**	**Wildlife Habitats**	**Totals ($)**
HUC 03130001				
Financial Assistance	32,005	11,741	-	43,746
Educational Assistance	140	106	-	246
Technical Assistance	6,401	2,348	-	8,749
Total	*38,546*	*14,196*	-	*52,742*
HUC 03130002				
Financial Assistance	18,106	17,993	-	36,099
Educational Assistance	79	163	-	242
Technical Assistance	3,621	3,598	-	7,220
Total	*21,806*	*21,754*	-	*43,560*
HUC 03130003				
Financial Assistance	11,992	8,698	16,703	37,392
Educational Assistance	53	79	199	330
Technical Assistance	2,398	1,740	3,347	7,485
Total	*14,443*	*10,516*	*20,249*	*45,208*
HUC 03130004				
Financial Assistance	7,881	11,564	6,223	25,668
Educational Assistance	35	105	74	213
Technical Assistance	1,576	2,313	1,238	5,127
Total	*9,492*	*13,981*	*7,535*	*31,008*
Grand Total				
Financial Assistance	69,983	49,996	22,926	142,905
Educational Assistance	307	452	273	1,032
Technical Assistance	13,997	9,999	4,585	28,581

implemented by the GFC, with the support of the forest industry, for the voluntary implementation of best management practices.

The Forestry Nonpoint Source Control Program is managed by a Statewide Coordinator and appointed foresters serving as District Coordinators from each of the twelve (12) GFC districts. The Statewide and District Coordinators conduct educational workshops, training programs and field demonstrations for the forest community (i.e., landowners, land management and procurement foresters, consulting foresters, timber buyers, loggers, site preparation contractors). The GFC investigates and mediates complaints involving forestry operations. In addition, the GFC conducts BMP compliance surveys to assess the effectiveness of BMP in the forest community. The GFC has established procedures for installing water control structures in firebreaks to reduce soil erosion and sedimentation.

In 1992, the GFC conducted a statewide BMP implementation survey by evaluating 342 sites. The most significant problems identified were with rate of implementation of BMPs on forest roads, skid trails, and stream crossings. Within the Chattahoochee River basin, the GFC evaluated 44 sites (1 mountain, 30 Piedmont and 13 Lower Coastal Plain). Thirty of the sites were on private lands, twelve forest industry lands and two public owned lands.

Approximately 42.2 miles of forest roads were evaluated on 40 sites of which 31.5 miles (75%) were in compliance with BMPs. Fifty eight percent of the sites maintained road grades in accordance with BMPs and water control structures (broad based dips, water bars, turnouts, etc.) were used on 44 percent of the sites. At critical areas such as stream crossings, roads were stabilized only on 31 percent of the sites with stream crossings.

Approximately 6,752 harvested acres were evaluated on 43 sites of which 6,345 acres (94%) were in compliance with the BMPs. On 24 sites that needed water bars installed in skid trails, only 3 sites (12%) actually installed them. Log decks in critical areas were retired and stabilized on 51 percent of the sites. Logging debris had been left in stream channels on 28 percent of the sites with streams. Random skidder crossings occurred on 33 percent of the sites with streams and temporary stream crossings consisting of debris and dirt were removed on 50 percent of the sites.

Approximately 2,017 site prepared acres were evaluated on three sites of which 2,007 acres (99%) were in compliance with BMPs. No problems were noted. Approximately 153 regenerated acres were evaluated on two sites of which 100 percent were in compliance with BMPs.

Since this survey, a massive BMP educational program was initiated and conducted. The GFC in cooperation with the Georgia Forestry Association (GFA) and the University of Georgia Cooperative Forest Extension Service has and is in the process of conducting professional forester, timber buyer and logger educational training. Member companies of the American Forest and Paper Association, as part of their Sustainable Forest Initiative, have funded an educational program called the Master Timber Harvesters Workshop with a goal of educating the 2,500 loggers in the state. The three day workshop which started in December 1995 focuses on forest ecology, silviculture, wildlife management, soils, hydrology, BMPs, harvest planning, insurance, OSHA regulations and business management. Already over 500 professional foresters and nearly 1,000 loggers have been trained. Because of this educational thrust, the

GFA has a goal of 100 percent BMP compliance by the year 2000. The GFC will be conducting BMP surveys in 1997 and 1999 to monitor this progress.

Recently, the State Board of Registration for Foresters adopted procedures to sanction or revoke the licenses of professional foresters involved in unresolved complaints where the lack of BMP implementation has resulted in state water quality or federal wetlands requirement violations.

Urban Nonpoint Source Control Strategies

The 1990 report of the Community Stream Management Task Force, We All Live Downstream, established a road map for urban nonpoint source management in Georgia. The Task Force was convened in 1988 to assist the Georgia Department of Natural Resources in developing a cooperative approach to prevention, control and abatement of nonpoint source impacts on urban streams. The Task Force's report emphasized the importance of cooperative partnerships and building working relationships between the units of government responsible for land and water quality management. Educational, management, and support strategies were recommended to help move toward an integrated structure which could provide continued evolution of intergovernmental and private sector roles and promote development of urban stream management activities over time.

The Task Force recognized two major impediments to effectively managing the quality of urban water bodies. The first is the division between 1) statutory responsibilities for management of water quality, granted to EPD, and 2) local government's Constitutional responsibility for management of the land activities which affect urban water bodies. The second impediment is the widespread nature of the nonpoint sources and the variety of activities which may contribute to impacts from urban runoff. They concluded that management of urban nonpoint source pollution would require ". . . a cooperative partnership between layers of government, the private sector, and the general public. The development of such a partnership will require a strong impetus to accept new institutional roles and make the structural changes necessary to support and sustain the stream management process."

Since publication of We All Live Downstream, urban nonpoint source management in Georgia has continued to evolve. Consistent with the multiple sources of urban runoff, the management systems has multiple focuses. Some programs focus on specific sources of urban runoff, targeting implementation of structural and/or management BMPs on individual sites or system wide. Other programs treat corridors along water bodies as a management unit to prevent or control the impacts of runoff on urban streams. Additional programs focus on comprehensive watershed management. This approach, which considers the impacts of all the land draining into a waterbody and incorporates integrated management techniques, is particularly critical to protecting or enhancing the quality of urban streams. The quality of urban waterbodies cannot be effectively managed without controlling the adverse impacts of activities in their watersheds.

While the state continues to have an important regulatory role, aspects of the cooperative intergovernmental partnerships envisioned by the Task Force have emerged and are being strengthened. EPD is implementing programs which go beyond traditional regulation, providing the regulated community with greater flexibility and responsibility for determining management practices. The agency is also expanding its role in facilitation and support of local management efforts. Development of this aspect of urban nonpoint source management will continue through the activities planned for the next five years.

EPD has a primary role in management of urban runoff, and is responsible for administering and enforcing a variety of permit programs, including permitting of stormwater discharges. In addition to these regulatory activities, EPD seeks to assist in development of local solutions to water quality problems; provides technical information on the water resources of the state; and administers grant programs, with funds from various sources to support non-point source planning and assessment, implementation of BMPs, and regional or local watershed management initiatives. EPD also conducts a variety of outreach and educational activities addressing urban runoff in general, regulatory requirements, and cooperative or non-regulatory approaches. Units within EPD which have responsibilities related to urban runoff are the surface Water Permitting Unit, housed in the Water Resources Management Branch, the Nonpoint Source Program, housed in the Water Protection Branch, and the Georgia Geologic Survey.

For urban runoff, activities of the Nonpoint Source Management Program interact strongly with point source controls for combined sewers and storm sewers, both of which discharge urban runoff through point conveyances. Current activities for urban surface runoff control include the following:

- Implement local nonpoint source (NPS) management programs, streambank and stream restoration activities, and community Adopt-A-Stream programs
- Develop and disseminate local watershed planning and management procedures
- Implement state and local Erosion and Sedimentation Control Programs
- Prepare and disseminate technical information on best management practices and nonpoint source monitoring and assessment.
- Implement NPS education programs for the general public, business and industry, local and regional governments, and school system
- Implement the Georgia Adopt-A-Stream Program, as described below in Section 7.1.6.
- Identify and evaluate resources to support urban watershed planning and management.

Local governments which have been granted the authority to issue land disturbing permits are encouraged to advertise and hold public educational workshops for those engaged in land disturbing activities (e.g., contractors, graders, etc.) in conjunction with GSWCC, EPD, and others. The purpose of these workshops would be to educate land disturbers regarding E&S law, proper installation and maintenance of erosion controls, BMPs, and fines and penalties for violators.

Since 1995, all newly certified local government E&S issuing authorities have been required to employ at least one qualified inspector who has passed the E&S short course taught by EPD and GSWCC. In addition, all existing local issuing authorities who have retained their issuing authority status following their proposed decertification by EPD, are similarly required to employ at least one qualified inspector who has passed the E&S short course taught by EPD and GSWCC. The number of qualified inspectors required for either new or existing local issuing authorities is determined by each local government based on the number of permits and sites within the jurisdiction of that local government.

Those local issuing authorities which have been audited, found to have erosion and sediment control program deficiencies, and notified of their proposed decertification by EPD, are required to submit monthly reports to EPD for up to six months in order to retain their issuing authority status. Each report specifies, at a minimum:

(1) a listing with map locations of permitted land disturbing activities;
(2) copies of inspection reports, notices of violation, citations, etc. issued;
(3) copies of court proceedings;
(4) corrective actions taken by cited violators; and
(5) other relative actions pertaining to administration and enforcement of the local government's ordinance and implementation of its erosion and sedimentation control program.

Riparian buffers along state waters are necessary to help reduce the amount of nonpoint source pollution entering state waters from land disturbing activities. The Georgia Erosion and Sedimentation Act of 1975 as Amended (the Act), Chapter 12-7-6(b) provides for the protection of state waters by explicitly prohibiting certain land disturbing activities within 100-feet of trout waters and 25-feet from other specified state waters. The Act does give the EPD Director the authority to issue variances authorizing encroachment into the stream buffer, provided the project is at least as protective of the natural resources and the environment as before the variance was issued. If a variance is approved, the conditions that are stated in the variance must be incorporated into the approved Erosion and Sedimentation Control Plan and into the land disturbing permit. An issuing authority cannot issue a land disturbing permit where a variance is needed until the variance has been issued by the Director. The conditions of the variance are enforceable provisions of the land disturbing permit. EPD encourages cities and counties, when adopting or revising their local erosion and sedimentation control ordinance, to make their riparian buffer protection requirements more restrictive than what is specified in the Act.

To demonstrate nonpoint source control strategies and mechanisms available to local governments and landowners, EPD encourages the concept of local action teams at the sub-watershed level to address comprehensive watershed assessment and management to implement basin plan recommendations to meet water quality goals. The local action teams would be based on community partnerships to facilitate successful reduction of nonpoint source pollution. The local action teams would promote a cooperative approach to solving water quality problems by establishing a multi-disciplinary collaboration of local partners. The partners could include local governments, local industry and business, community groups, planning groups, local health departments, and any other interested local parties with a stake in the watershed. Funding for the local teams could be sought by the local partners. An example of this approach has been initiated in the Columbus area where a comprehensive watershed assessment is being sponsored by the Columbus Water Works.

EPD has provided both financial and technical support to and encouraged the development of local government water quality management programs. Projects have included support of local streamwatch programs in DeKalb, Fulton and Gwinnett Counties, and the Cities of Roswell and Alpharetta; support of the education and inspection program for streamside industries and businesses in the City of Gainesville; support of a pilot program to set up water-watch programs for neighborhood planning units in the City of Atlanta; support of stream assessment and the development of a local stream management program in the Cities of Alpharetta and Roswell; and an annual Adopt–A–Stream Conference.

7.1.4 Floodplain Management

Floodplain Management Strategies

Floodplain Management in the State of Georgia is administered under federal regulations and local ordinances. The federal statues are found in Title 44 of the Code of Federal Regulations Parts 59-79. As a condition of participation in the National Flood Insurance Program (NFID), local political jurisdictions voluntarily adopt Flood Damage Prevention Ordinances, which are based on federal regulations, to enforce and administer floodplain development. Georgia's Floodplain Management Office has no regulatory authority.

Georgia's Floodplain Management Office, located within the Department of Natural Resources, Environmental Protection Division, serves as liaison between the Federal Emergency Management Agency (FEMA) and local governments participating in the NFIP. However, Georgia's Floodplain Management Office has no regulatory authority. Participation in the NFIP is a requirement for the Federal Government to make flood insurance available to all residents of the community. Through training workshops, quarterly newsletters, and technical assistance, the Floodplain Management Office assists local governments to maintain compliance with NFIP requirements. The Floodplain Management Office also provides technical data, floodplain maps, and training workshops to various public and private entities involved in floodplain management and floodplain determinations. In addition, the Floodplain Management Office reviews all state-funded and federally-funded projects for development in designated Special Flood Hazard Areas. A major thrust of the Floodplain Management Office is to increase local government participation in the NFIP beyond the 54% level achieved in 1996.

River Care 2000 Program

Georgia also has strategies to protect and manage riparian floodplain areas. Of particular relevance is River Care 2000, a conservation program which Governor Miller established in September 1995. One key objective of this program is acquisition of river-corridor lands for purposes of protection and to forestall unwise development in flood-prone areas. To date, River Care 2000 has obtained $15.6 million in acquisition funds, and has begun negotiations to acquire suitable riparian lands via voluntary sales. The Coordinating Committee has approved procedures for three types of projects:

Riverway Demonstration Projects, which improve public access to a river with scenic and recreation uses, and protects natural and historic resources by acquiring and managing land in the river corridor;

Significant Sites, which are tracts of land which DNR will acquire and operate as a traditional state public-use facility: wildlife management or public fishing area, park or historic site, natural area, or greenway; and

Restoration Sites, which are tracts of land which the state will identify, acquire, and manage to reduce nonpoint-source water pollution.

7.1.5 Wetland Management Strategies

The loss of wetlands, because of the associated adverse impacts to flood control, water quality, aquatic wildlife habitat, rare and endangered species habitat, aesthetics, and recreational benefits, has become an issue of increasing concern to the general public as they become better informed of the values and functions of wetlands. We still suffer from the lack of accurate assessments for current and historic wetland acreage, but, regardless of the method used to measure total acreage or wetland losses, Georgia still retains the highest percentage of precolonial wetland acreage of any south-eastern state.

Efforts to Track No Net Loss of Wetlands

While the 1993 Federal Administration Wetlands Plan calls for a concerted effort by EPA and other federal agencies to work cooperatively toward achieving a no overall net loss of wetlands in the short term and a net increase in the quantity of the nation's wetlands in the long run, there have been no statutory or executive level directives to carry out this policy. Achievement of the goal of no net loss is dependent upon limited changes to regulations, memoranda of understanding, cooperative agreements, and other partnerships between federal, state, and local governments, conservation organizations, and private citizens.

All dredge and fill activities in freshwater wetlands are regulated in Georgia by the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act. The majority of wetland alterations occur under nationwide or general permits, which include permits for bridge building, minor road crossing fills, and fills of less than ten acres above the "headwaters" point of non-tidal streams where the annual average flow is less than 5 cubic feet per second. Enforcement is carried out by the COE and EPA in freshwater wetlands. Normal agricultural and silvicultural operations are exempted under Section 404 regulations.

The COE may require wetland mitigation activities in association were permitting, including creation, restoration, and protection of wetlands. COE may also require wetland restoration in case of violations. In the settlement of violations, restorations occurred on 16.8 acres in 1994, and 17.8 acres in 1995.

Land Acquisition

The Department of Natural Resources (DNR), Wildlife Resources Division (WRD), began a land acquisition program in 1987 to acquire 60,000 acres of additional lands for Wildlife Management Areas (WMAs) and Public Fishing Areas (PFAs). This initiative was funded by $30 million of 20-year obligation bonds to be paid off by hunting and fishing license increases and WMA permit fees.

Beginning in 1990 Governor Zell Miller initiated Preservation 2000, a $60 million program to acquire 100,000 acres of lands to be used for wildlife and fisheries management, parks and recreation, natural area preservation, and general conservation. Through December, 1995, 100,000 acres had been acquired by purchase, gift, or long term lease under this program. Additional wetlands acquisition occurs as part of the River Care 2000 initiative, discussed above.

Education And Public Outreach

WRD has one full-time person involved in aquatic education, providing training for educators in wetland values and acting as a resource person for developing and coordinating teaching materials. The Aquatic Education Program consists of three key components: Youth Education, Adult Education, and Kids Fishing. Youth Education involves training educators to use Aquatic Project Wild (APW), which consists of instructional workshops and supplementary conservation curriculum materials for teachers of K-12 grade children. About 1,000 educators are trained annually to use APW in the classroom. Adult Education consists primarily of producing educational materials such as the annual Freshwater and Saltwater Sport Fishing Regulations, Reservoir and Southeast Rivers Fishing Predictions, Small Georgia Lakes Open to Public Fishing, Introduction to Trout Fishing, news releases, brochures, radio Public Service Announcements, videos, and staff presentations to sportsmen and civic organizations, as well as large events. The purpose of Kids Fishing Events (KFE) is to introduce youth and their families to the joys of recreational fishing.

The aquatic education program touches tens of thousands of youths and adults each year, bringing these people closer to the environment, and teaching them conservation principles that are important to sustaining healthy fish populations, such as clean lakes and streams, and maintaining functional wetlands.

State Protected Species in Wetlands

With assistance from the US Fish and Wildlife Service, Section 6 Federal Aid Program, and USDA-Forest Service Stewardship Program, WRD has developed and published a descriptive handbook of Georgia's 103 protected plant species that includes endangered, threatened, unusual, and rare plant species found in the state. Forty percent of the protected species are dependent on wetland or aquatic habitats in the vast majority of known occurrences. The "Protected Plants of Georgia" book includes illustrations, descriptions, threats to species or their habitats, range in adjoining states, historical notes, and recommendations for management of protected species habitats.

The protected plant book has been distributed to all DNR personnel and wildlife biologists involved in the management of state properties. The protected plant book is being distributed to Georgia Forestry Commission (200), USDA-Natural Resource Conservation Service (300), Forest Service, US F&WS, Corps of Engineers, US EPA, major utility companies, forest products corporations, consulting biologists, educators, and private citizens. The book will call the public's attention to the need to protect wetlands on private property as well as public property in the state.

7.1.6 Stakeholder Involvement/Stewardship Strategies

Stakeholder involvement and stewardship are essential to address one of the major challenges identified by the Community Stream Management Task Force in We All Live Downstream: nonpoint sources of pollution are diffuse and varied, therefore prevention, control and abatement of nonpoint source impacts will require action by a wide range of audiences. Effective nonpoint source management must address the numerous activities of individuals, businesses, industries, and governments which can adversely affect urban and rural waters. In many cases, these groups are unaware of the potential impacts of their activities or corrective actions which may be taken. Consequently, community and citizen educational strategies were emphasized in the Task Force’s recommendations.

Georgia has chosen a two-pronged approach to encourage stewardship via education and citizen monitoring. EPD is the lead agency in these education and citizen monitoring programs, but like other aspects, of the state’s nonpoint source management effort, cooperative efforts with local governments and community-based groups are critical to their implementation. Outreach and education, including citizen monitoring, lays the groundwork for behavior change and is often an important pre-requisite for effective implementation of BMPs and comprehensive watershed management programs. The first component of the state's education and citizen monitoring program is development of Georgia Adopt-A-Stream, designed to promote citizen monitoring and waterbody protection. The second prong of the state's effort is general education. A report outlining a plan for nonpoint source education in Georgia was completed in 1994. Titled Georgia Urban Waterbody Education Plan and Program, the plan laid out nonpoint education strategies for seven target audiences: general public, environmental interest organizations, civic associations, educators, business associations, local government officials, and state government officials. Given limited resources and the scope of effort required to target each of these audiences concurrently, EPD decided to initially target nonpoint source education efforts toward educators and students in grades K-12. When programs for that audience have been fully implemented, the focus of nonpoint source education in the state will be re-evaluated and additional target audience(s) identified to encourage active involvement in controlling nonpoint source pollution. EPD nonpoint source program staff will be available, time-permitting, to assist the local advisory committees in outreach efforts.

General goals for stakeholder involvement and stewardship strategies are:

- Generate local support for nonpoint source management through public involvement and monitoring of streams and other water bodies and of results of management actions.
- Increase individual's awareness of how they contribute to nonpoint source pollution problems and implement appropriate strategies to motivate behavior change and actions to address those problems.
- Provide the educational tools, assistance, and support for addressing NPS problems to target audiences across the state.

Georgia Adopt-A-Stream

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program. Currently, more than 5,000 volunteers participate in individual and community sponsored Adopt-A-Stream Programs. Volunteers conduct clean-ups, stabilize streambanks, monitor streams using biological and chemical methods, and evaluate habitats and watersheds. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The Georgia Adopt-A-Stream Program focuses on what individuals and communities can do to protect Georgia's water resources from nonpoint source pollution. The Program offers training and support in the following activities – watershed surveys, visual surveys, biological monitoring, chemical testing and clean ups.

In 1989 the DNR appointed a Community Stream Management Task Force (CSMTF) to seek a cooperative intergovernmental approach to integrate land and water quality management to correct, abate, and prevent stream contamination. A final report containing the task force's findings and recommendations was released during the second quarter of 1991. EPD utilized the task force's recommendations regarding the development of resources and initiating programs for local and regional governments including participation by the general public. EPD developed and presented a local government stream management and assessment work-shop. A task force was assembled and a report prepared to guide the development of a Adopt-

A-Stream Program for Georgia. EPD has made numerous presentations to encourage the formation of local Adopt-A-Stream organizations, assembled and distributed a package of materials for interested groups, provided technical assistance, and provided grant support to programs operated by local governments. In 1993, EPD hired full–time coordinators for the statewide Adopt–A–Stream and Nonpoint Source Education Programs.

The Georgia Adopt-A-Stream Program addresses nonpoint source pollution from agriculture, silviculture, construction and urban runoff. The focus of the Adopt-A-Stream Programs in middle and southern Georgia is often agricultural NPS pollution (especially, where land use is largely agricultural crop production). Examples of agricultural NPS pollution are presented in workshops, videos and manuals (e.g., excess fertilizer and animal waste). In north Georgia, the focus is generally silvicultural NPS pollution (especially, in areas adjacent to the Chattahoochee and Oconee National Forests). Adopt-A-Stream Programs in urban areas address construction and urban runoff NPS pollution. Workshops and training sessions emphasize the connection between land use, stormwater runoff and water resources. Erosion and sedimentation control at construction sites is always a major concern with volunteers. Therefore, Georgia's Erosion and Sedimentation Act is explained and the issuing authority for land disturbing activity permits is identified.

Volunteers are offered three (3) levels of involvement. Each level involves an education and action component on a local stream. Volunteers commit for a minimum of one (1) year on a half-mile stream segment. Level I consists of setting up a project (i.e., identifying a stream segment, identifying partners, registering with the Georgia Adopt-A-Stream Program), evaluating land use and stream conditions during a "watershed walk", conducting quarterly visual evaluations and clean-ups, and one public outreach activity. Volunteers create a "Who to Call for Questions or Problems" list so that if something unusual is noted, immediate professional attention can be obtained. Level II builds on Level I by adding either biological monitoring, chemical monitoring or a habitat improvement project. Level III includes two or more Level II activities.

Approximately 500 volunteers participate in the various workshops each year. An "Introduction to Adopt-A-Stream Program" and "Watershed Walk" videos have been produced, duplicated and distributed on loan. The Georgia Adopt-A-Stream Program Manuals have been printed and distributed to approximately 1,000 volunteers. In addition, a bi-monthly newsletter is published and distributed to over 1,000 volunteers. The Annual Georgia Adopt-A-Stream Conference and Awards Ceremony is held each fall. The Georgia Adopt-A-Stream Program assists EPD in organizing the Annual Georgia River Clean-Up Week each fall, with over 1000 volunteers cleaning up river segments in over 50 locations. In addition, the Georgia Adopt-A-Stream Program conducts numerous presentations around the State.

The Georgia Adopt-A-Stream Program is a statewide program with two (2) staff positions in EPD and five (5) Regional Training Centers. The Regional Training Centers are a network of college-based training centers located in Albany, Columbus, Dahlonega, Milledgeville and Savannah. This network of training centers allows the Georgia Adopt-A-Stream Program to be accessible to all areas of the state.

Several organizations have already established Adopt-A-Stream Programs in the Chattahoochee Basin, including City of Alpharetta, Clayton County, Gainesville-Hall County, Gwinnett

County, and City of Roswell. Appendix F provides a list of Georgia Adopt-A-Stream volunteer groups in the Chattahoochee River Basin.

With funding from the Captain Planet Foundation, U. S. Environmental Protection Agency and the Turner Foundation, the Upper Chattahoochee Riverkeeper has augmented the Georgia Adopt-A-Stream Program with a focused environmental education effort to create a minimum of six new Adopt-A-Stream Programs each year throughout the Chattahoochee River Watershed and to connect the forty existing programs and new groups in the watershed.

The Chattahoochee River Adopt-A-Stream Network brings the program to a wider audience throughout the fifteen counties in the Upper Chattahoochee River Basin. Currently, 75% of the existing Adopt-A-Stream Programs are located in metropolitan Atlanta. Outlying communities and rural agricultural areas have fewer resources and opportunities to initiate water quality monitoring programs. The Upper Chattahoochee Riverkeeper will target these outlying areas, as well as certain threatened streams in Atlanta, which do not have Adopt-A-Stream Programs in place.

With the Program's outreach activities, nonpoint source pollution sources and preventive measures are described. As with any public outreach program, the prevention, control and/or abatement of nonpoint source pollution must be measured indirectly. As outlined, the active participation of volunteers and local and regional governments in the Georgia Adopt-A-Stream Program indirectly point towards significant pollution prevention.

Nonpoint Source Education: Project WET

As described above, EPD is currently targeting initial nonpoint education activities toward educators and students in grades K-12. To reach this target audience, EPD has focused on implementing Project WET, a water resources education curriculum which focuses on nonpoint pollution. Covering impacts on groundwater and on surface water, the curriculum addresses the following nonpoint sources: agriculture, forestry, urban, and construction. It is recognized nationally and internationally and is readily adaptable to fit the State's Quality Core Curriculum requirements. To date, nonpoint source concerns have not received significant emphasis in water resources education efforts in Georgia. Implementation of Project WET will address this gap, providing educators and students in grades K-12 with an understanding of the problems caused by nonpoint source pollution and of the tools that can be used to prevent, control or abate nonpoint source impacts. EPD began implementing Project WET in December 1996. Initial facilitator training sessions were conducted in January and February 1997.

Resources for teachers which are currently available include a curriculum module on groundwater flow, the Enviroscape teaching module, and the River of Words Teacher's Guide. Resources which are under development include an Educator Newsletter, a Web page for students, the Georgia River Resource Guide, the Georgia Liquid History Well, Georgia River Trunks (a traveling puppet show) and Hydora (a NPS education performance character). In addition to these resources, an awards program is planned to recognize outstanding efforts on behalf of Project WET and nonpoint source education in Georgia. EPD will be the lead agency of Project WET for a minimum of three years. Initially, implementation will target selected population centers with existing environmental education activities to help leverage the limited resources of EPD's NPS Education Program. It is expect that full implementation of Project WET will take three years. EPD will serve as the lead agency for period with the following acting as cooperating agencies: Georgia Environmental Education Alliance, State PTA, National Park

Service, Southface Energy Institute, and Zoo Atlanta. After three years, it is expected that a cooperating agency will assume responsibility for on-going Project WET activities. At that time, the focus of the state's NPS education activities will be re-evaluated and, depending on the focus of education efforts undertaken by other entities, another of the audiences identified in the 1994 education plan may be targeted.

7.1.7 Ground Water Protection Strategies

In 1984, EPD developed its first management plan to guide the management and protection of Georgia's ground water quantity and quality. The current version, Georgia Geologic Survey Circular 11, published in 1996, is the basis of Georgia's application to be certified by U.S. EPA for a Comprehensive State Ground Water Protection Plan (CSGWPP). The goal of Georgia's ground water management plan is:

> . . . to protect human health and environmental health by preventing and mitigating significant ground water pollution. To do this, Georgia will assess, protect, and, where practical, enhance the quality of ground waters to levels necessary for current and projected future uses for public health and significant ecological systems.

The goal recognizes that not all ground water is of the same value. The Division's goal is primarily preventive, rather than curative; but it recognizes that nearly all ground water in the state is usable for drinking water purposes and should remain so. EPD pursues this goal through a policy of anti-degradation by which ground water resources are prevented from deteriorating significantly, preserving them for present and future generations. Selection of this goal means that aquifers are protected to varying degrees according to their value and vulnerability, as well as their existing quality, current use, and potential for future use.

EPD has adequate legal authority to prevent ground water from being significantly polluted and to clean-up ground water in the unlikely event pollution were to occur. Extensive monitoring has shown that incidents of ground water pollution or contamination are uncommon in Georgia; no part of the population is known to be at risk.

In general, the prevention of ground water pollution includes—(1) the proper siting, construction, and operation of environmental facilities and activities through a permitting system; (2) implementation of environmental planning criteria by incorporation in land-use planning by local government; (3) implementation of a Wellhead Protection Program for municipal drinking water wells; (4) detection and mitigation of existing problems; (5) development of other protective standards, as appropriate, where permits are not required; and (6) education of the public to the consequences of ground water contamination and the need for ground water protection.

Ground water pollution is prevented in Georgia through various regulatory programs (administered by the State's Department of Natural Resources) which regulate the proper siting, construction, and operation of the following:

- public water supply wells, large irrigation wells and industrial wells withdrawing more than 100,000 gallons per day,
- injection wells of all types,

- oil and gas wells (including oil and gas production),
- solid waste handling facilities,
- hazardous waste treatment/storage/disposal facilities,
- municipal and industrial land treatment facilities for waste and wastewater sludge,
- municipal and industrial discharges to rivers and streams,
- storage/concentration/burial of radioactive wastes, and
- underground storage tanks.

EPD prevents the contamination of ground water used for municipal drinking water through an EPA-approved Wellhead Protection Program. As a result of this program, certain new potentially polluting facilities or operations are restricted from wellhead protection areas, or are subject to higher standards of operation and/or construction. EPD also encourages local governments to adhere to the Criteria for the Protection of Groundwater Recharge Areas (a section of the Rules for Environmental Planning Criteria), which define higher standards for facility siting, operation, and clean-up in significant ground water recharge areas. The most stringent guidelines of these criteria pertain to those recharge areas with above average ground water pollution susceptibility indexes.

Additionally, EPD has legal authority under the Georgia Water Quality Control Act to clean up ground water pollution incidents. Additional clean up authority occurs as special trust funds established to clean up leaking underground storage tanks, abandoned hazardous waste sites, and scrap tire dumps.

Most laws providing for protection and management of ground water are administered by EPD. Laws regulating pesticides are administered by the Department of Agriculture, environmental planning by the Department of Community Affairs; and on-site sewage disposal, by the Department of Human Resources. EPD has established formal Memoranda of Understanding (MOU) with these agencies. The Georgia Groundwater Protection Coordinating Committee was established in 1992 to coordinate groundwater management activities between the various departments of state government and the several branches of EPD.

7.2 Targeted Management Strategies

This section describes specific management strategies that are targeted toward the concerns and priority issues for the Chattahoochee River basin described in Section 6. Strategies are presented by geographic area. For each of the identified concerns, the management strategy statement consists of five components: a problem statement (identical to that given in Section 6), general goals, ongoing efforts, identified gaps and needs, and strategies for action. The purpose of these statements is to provide a starting point for key participants in the sub-basin to work together and implement strategies to address each priority concern. In some cases, a strategy may simply consist of increased monitoring; in other situations, the stakeholders in the sub-basin will need to develop innovative solutions to these water quality issues. While EPD will continue to provide technical oversight, conduct monitoring surveys, and evaluate data, locally-led efforts in the sub-basins will be required to help to restore and maintain the water quality throughout the Chattahoochee River basin.

For many issues, similar strategies, with minor variations, are appropriate for several different geographic areas. In addition, similar targeted strategies may be used to address a variety of priority concerns if these concerns are linked to the same source of stress. For example, successfully controlling urban runoff can reduce loadings of metals, fecal coliform bacteria, and sediments entering a water body.

7.2.1 Hydrologic Unit 03130001, Area A (Headwaters to Lake Lanier) and Lake Lanier

Hydrologic Unit 03130001 is discussed in two parts (Areas A and B). Area A includes the Chattahoochee River watershed upstream of Buford Dam, with land use ranging from the urban area of Gainesville to forest covered mountains with trout streams. The valuable resource of Lake Lanier is also included. Water quality in this area is generally good.

The concerns identified for portions of this subbasin include metals concentrations, fecal coliform bacteria, erosion and sedimentation, nutrients, and water quantity.

Issue A: Metals

Problem Statement: The water use classification of fishing was not fully supporting in two Chattahoochee River mainstem segments, in 4 tributary stream segments, and in two areas of Lake Lanier due to exceedences of the water quality standards for metals. Lead, copper, and/or zinc standards were exceeded in the river due to a water pollution control plant discharge in one segment and to nonpoint sources in the second segment; zinc, copper, lead and/or mercury standards were exceeded in tributary streams due primarily to nonpoint sources in three segments and to a water pollution control plant in one segment; and nonpoint sources of lead and mercury were exceeded once each in a different portions of Lake Lanier.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: The primary contributor of metals to streams are nonpoint sources. In cases where a water pollution control plant was the likely cause of the elevated metals concentration, EPD has taken enforcement action through the NPDES permitting process to require compliance with NPDES permit limits for metals.

The Lake Lanier Water Quality Cooperative River Basin Study is ongoing to identify existing and potential source impacts to Lake Lanier from the Upper Chattahoochee and Chestatee Rivers. This project is sponsored by the Upper Chattahoochee River Soil and Water Conservation District, Hall County Soil and Water Conservation Districts and the Chestatee-Chattahoochee RC&D Council. Sediment and agricultural chemical and nutrient loadings will be used to assess nonpoint source pollution from agricultural, forested and other rural sources. A GIS data base will be developed that delineates potential areas of nonpoint source pollution to be used by the Georgia Soil and Water Conservation Districts to prioritize technical and financial assistance.

The EPD is conducting a Clean Lakes Phase I Diagnostic-Feasibility Study of Lake Lanier . The study is being done by contract with the University of Georgia and the Tennessee Valley Authority. The study will provide information on sources of metals in the watershed. Initial results of this work suggest that mercury in the watershed may be coming from atmospheric deposition, urban runoff, and/or from past gold mining operations in the Dahlonega Gold Belt, including the Chestatee and Yahoola Creek drainages (Leigh and Gamble, 1997).

Identified Gaps and Needs: EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, the first step to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Additional biological monitoring may be appropriate to measure impacts along with concentrations of metals. Restoration goals for urban streams are not clearly defined. Consideration should be given to the interaction of metals and habitat degradation: mitigation of metals may have little beneficial impact unless habitat issues are also addressed. It is probable, however, that streams with highly urbanized watersheds cannot be restored to pristine "natural" conditions.

Strategies for Action: Addressing metals from nonpoint sources will be a complex task. An initial task will be to conduct additional monitoring to document if water quality standards are actually being exceeded.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters; continue to enforce point source compliance with metal limits through the NPDES permitting program; and conduct additional monitoring to document metals concentrations in segments affected by nonpoint sources of metals.

- Other participants: to be identified contingent on further analysis to confirm metal concentrations and on identification of potential sources.

Specific Management Objectives: Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: EPD will take the lead in conducting additional monitoring to confirm if water quality standards are being exceeded. If violations are documented, EPD will develop a plan to assess sources and identify alternative solutions.

Action Plan:

- UGA and TVA will complete and report on the Clean Lakes Phase I Diagnostic-Feasibility Study work in 1998.

- The Upper Chattahoochee River Soil and Water Conservation District, Hall County Soil and Water Conservation Districts and the Chestatee-Chattahoochee RC&D Council will complete and report on their study of the Lake Lanier watershed.

- EPD will complete a review of existing metals data in listed segments by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: To be proposed as strategies are refined.

Issue B: Fecal Coliform Bacteria

Problem Statement: The water use classification of fishing or recreation was not fully supported in three Chattahoochee River mainstem segments and 30 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes. This area has a high concentration of poultry operations, and spreading of poultry waste on fields may be a potential source.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: One water pollution control plant was cited as a potential source of fecal coliform bacteria and is under Order to achieve compliance with permit limits. The principal sources of exceedances of water quality standards for fecal coliform bacteria are urban runoff and rural nonpoint sources.

Recently, several water quality demonstration projects have been developed with Clean Water Act Section 319(h) funds to address agricultural nonpoint source pollution management in this basin. Between 1989 and 1994, the Chestatee-Chattahoochee RC&D Council evaluated practices for handling animal manure in the White Creek and Mossy Creek watersheds. These watersheds contain 25 million head of poultry, 18,000 hogs, and 5,000 cattle. The project demonstrated advantages of composting over traditional manure applications of poultry waste, including reduced potential for coliform loading to streams. In addition, the project demonstrated to dairy farmers that installing heavy use area BMPs would reduce surface runoff and groundwater contamination.

Also with Section 319(h) funds, GSWCC demonstrated a “total resource management” system on a dairy farm in Hall County. This demonstration project serves as a model for other producers to develop an integrated set of BMPs to control, prevent, and/or abate nonpoint source pollution associated with dairy operations.

The EPD is conducting a Clean Lakes Phase I Diagnostic-Feasibility Study of Lake Lanier. The study is being done by contract with the University of Georgia and the Tennessee Valley Authority. The study will provide information on sources of fecal coliform bacteria in the watershed.

Identified Gaps and Needs: Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal bacterial loads may be attributable to natural sources (e.g., wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform sources. Sanitary sewer leaks and overflows may be a source of fecal coliforms. In addition, previous sampling was not conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle may be to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Strategies for Action: Separate strategies are needed to address nonpoint fecal coliform bacteria loading for urban and agricultural sources.

Urban Areas

Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for October 2001-September 2002, in accordance with the statewide RBMP management cycle.

Key Participants and Roles:

- EPD: monitor and assess use support in listed stream segments and encourage local efforts to address nonpoint source pollution.
- Local governments: operate and maintain sewer systems and wastewater treatment plants, monitor land application systems, develop stormwater programs, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Local heath departments: continue to identify and correct poorly operating septic systems and educate owners about the proper maintenance of septic tank systems.

Specific Management Objectives: Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level.

Action Plan:

- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- EPD will continue to administer the stormwater program.

- EPD will encourage local governments to develop urban stormwater managment strategies which may include construction of abatement structures such as plunge pools, flow spreaders, check dams, retention basins, compost, stormwater treatment systems, and sand filters.

- EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdictions.

- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.

- EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December, 2000, in accordance with the statewide RBMP management cycle.

Method for Tracking Performance: EPD tracks point source discharges through inspections and evaluations of self-monitoring data. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Rural Areas

Key Participants and Roles:

- EPD: monitor and assess use support in listed streams, encourage local planning efforts, regulate point sources under the NPDES program.

- GSWCC and local SWCDs and RC&D councils with assistance form NRCS: promote implementation of agricultural management practices.

- County and municipal governments: septic system regulation, and land use planning guidelines.

Specific Management Objectives: Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Evaluation will be on a site-by-site basis. For agricultural BMP support, existing prioritization methods of the agricultural agencies will be used.

Action Plan:

- EPD will continue to ensure that permitted point sources remain in compliance with fecal coliform bacteria limits.

- GSWCC and local agricultural agencies will continue to support adoption of BMPs for animal waste handling. Methods for prioritization and implementation of cost-share incentives under the 1996 Farm Bill are still being worked out, but it is expected that incentives will be targeted to areas of apparent water quality impact, including rural streams which may sustain excessive fecal coliform loads from animal operations.

- DHR is in the process of developing new regulations for septic systems. DHR will work to educate local governments and citizen groups about the need for adequate regulation and maintenance of septic systems to protect water quality.

Method for Tracking Performance: Agricultural agencies will track rates of BMP implementation for animal operations. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue C: Erosion and Sedimentation

Problem Statement: The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment, which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

General Goals: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Ongoing Efforts: The Lake Lanier Water Quality Cooperative River Basin Study is ongoing to identify existing and potential source impacts to Lake Lanier from the Upper Chattahoochee and Chestatee Rivers. This project is sponsored by the Upper Chattahoochee River Soil and Water Conservation District, Hall County Soil and Water Conservation Districts and the Chestatee-Chattahoochee RC&D Council. Sediment and agricultural chemical and nutrient loadings will be used to assess nonpoint source pollution from agricultural, forested and other rural sources. A GIS data base will be developed that delineates potential areas of nonpoint source pollution to be used by the Georgia Soil and Water Conservation Districts to prioritize technical and financial assistance.

The 1992 Georgia Forestry Commission (GFC) compliance survey examined 10 sites in HUC 03130001 and found 85% of harvested forest acres and 84% of forest road miles in compliance with BMPs. GFC is targeting education to increase compliance with forestry BMPs.

GSWCC has recently updated, and has made available for distribution, the Manual for Erosion and Sedimentation Control in Georgia, which will be distributed to personnel working on erosion and sedimentation issues throughout the state.

The EPD is conducting a Clean Lakes Phase I Diagnostic-Feasibility Study of Lake Lanier. The study is being done by contract with the University of Georgia and the Tennessee Valley Authority. The study will provide information on the issue of erosion and sedimentation in the watershed. Initial results of the Clean Lakes study include recommendations on control of erosion and sedimentation including adoption of NRCS recommendations for BMPs for crop land and pasture, sediment management on forest property, improvement of unpaved county roads to reduce sediment loads, and erosion and sediment control on new construction sites (Hatcher, 1994).

Identified Gaps and Needs: Adverse impacts of excess sediment loading include degradation of habitat and reduction in species diversity. These types of impacts are best addressed through biological monitoring. EPD is developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBMPs) for benthic macroinvertebrates. The EPD protocols include habitat assessment. The WRD is working with the IBI (Integrated Biotic Index) to assess fish communities. These tools will provide methods to detect and quantify impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

Unpaved rural roads are thought to be a significant contributor to sedimentation but the amount of loading is unclear. Further monitoring may be needed to quantify the impact of rural roads as a source of sedimentation into streams.

A key need for developing strategies to address erosion, sedimentation, and habitat issues in urban streams is definition of appropriate management goals. It is likely that streams with highly urbanized watersheds cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD and other stakeholders.

Strategies for Action: Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Key Participants and Roles:

- EPD: encourage local government water quality improvement efforts; and continue the development of biomonitoring methods.
- Local governments: where the issuing authority enforce erosion controls for construction practices, land use planning.
- GSSWC and local S&WCDs and RC&D Councils with assistance from NRCS: encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC: continue to monitor and encourage implementation of forestry BMPs.
- USFS: lead agency for management of forest lands within the Chattahoochee National Forest.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Management Option Evaluation: During this iteration of the basin cycle, management will focus on source control BMPs.

Action Plan:

- GSSWC and local S&WCDs and RD&D Councils with assistance from NRCS will encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC will target landowner and user groups for BMP education to encourage compliance with forestry BMP guidelines.

- USFS to continue BMP implementation, stream assessments, and water quality management in the Chattahoochee National Forest.
- Local governments where the issuing authority will enforce erosion controls for construction practices.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- EPD and WRD will continue to develop biological monitoring capabilities designed to assess aquatic life.

Method for Tracking Performance: GSWCC and GFC will track BMP implementation.

Issue D: Nutrients

Problem Statement: The water use classifications of fishing, drinking water, and recreation are potentially threatened in Lake Lanier due to inputs of nutrients which may cause excess algal growth in the lake. Nutrient sources include water pollution control plant discharges and nonpoint sources from urban and agricultural areas.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: An initial Phase I Clean Lakes report for Lake Lanier was issued in 1994 (Hatcher, 1994). This provides draft nutrient budgets for the lake, but also documented the need for further study, which is ongoing.

The Lake Lanier Water Quality Cooperative River Basin Study is ongoing to identify existing and potential source impacts to Lake Lanier from the Upper Chattahoochee and Chestatee Rivers. This project is sponsored by the Upper Chattahoochee River Soil and Water Conservation District, Hall County Soil and Water Conservation Districts and the Chestatee-Chattahoochee RC&D Council. Sediment and agricultural chemical and nutrient loadings will be used to assess nonpoint source pollution from agricultural, forested and other rural sources. A GIS data base will be developed that delineates potential areas of nonpoint source pollution to be used by the Georgia Soil and Water Conservation Districts to prioritize technical and financial assistance.

Counties and municipal governments with utilities and jurisdictions in the Chattahoochee River Basin above Buford Dam have formed an Upper Chattahoochee Basin Group (URBG). The mission of the Group is to develop information and tools to promote the protection of water quality and efficient use of water resources within the basin. One project initiated by the Group is the development of a water quality model for Lake Lanier for use in evaluating impacts of various alternative proposals for water supply and treated wastewater discharges.

As part of ongoing work to assess nonpoint sources in the Lake Lanier watershed, EPD has contracted with the Tennessee Valley Authority (TVA) to obtain 1996 color infrared aerial photography of a portion of the watershed and produce interpretations, maps, and summaries of potential nonpoint sources of pollutant loads. This geographic database will provide an important tool for managing nutrient loading as well as loading of other pollutants. This work is a part of the ongoing Clean Lakes Phase I Diagnostic-Feasibility Study of Lake Lanier.

Several water quality demonstration projects have been developed with Section 319(h) funds to address agricultural nonpoint source management of nutrients in this basin. Between 1989 and 1994, the Chestatee-Chattahoochee RC&D Council evaluated practices for handling animal manure in the White Creek and Mossy Creek watersheds. These watersheds contain 25 million head of poultry, 18,000 hogs, and 5,000 head of cattle. The project demonstrated advantages of composting over traditional manure applications to fields for poultry waste. In addition, the project demonstrated to dairy farmers that installing heavy use BMPs would reduce surface runoff and groundwater contamination, while stream corridor management would stabilize stream banks.

GSWCC also demonstrated a “total resource management system” on a dairy farm in Hall Co. in the upper Chattahoochee River basin. This demonstration project serves as a model for other producers to develop an integrated set of BMPs to control, protect, and/or abate nonpoint source pollution associated with dairy operations.

Identified Gaps and Needs: The initial Phase I Clean Lakes report (Hatcher, 1994) documented the need for substantial further study to develop and evaluate an effective management plan for nutrients in the Lake Lanier drainage. This work is ongoing as a part of the Clean Lakes Phase I Diagnostic-Feasibility and as a part of the Lake Lanier Water Quality Cooperative River Basin Study.

Strategies for Action: Protection of Lake Lanier will require basinwide strategies to control nutrient loads. Initial efforts will focus on continued BMP implementation for source control. A more focused plan is expected to emerge from completion of the Lake Lanier Cooperative River Basin Study and the Clean Lakes Phase I Diagnostic-Feasibility Study.

Key Participants and Roles:

- EPD: monitor and assess use support in area waters as a part of the river basin monitoring process; encourage voluntary nonpoint source control strategies; regulate wastewater treatment plants and other point sources of nutrient load; propose nutrient standards for Lake Lanier following completion of the Clean Lakes Diagnostic-Feasibility and Lake Lanier Cooperative River Basin Studies.
- GSWCC and local S&WCDs and RC&D Councils with assistance from NRCS: promote implementation of agricultural management practices to reduce erosion and nutrient export.
- The Lake Lanier Water Quality Cooperative River Basin Study, sponsored by the Upper Chattahoochee River S&WCD, the Hall Co. S&WCD, and the Chestatee-Chattahoochee RC&D Council: basin management strategies and provide a forum for local stakeholder participation in the strategy.
- Georgia Forestry Commission: encourage implementation of forestry BMPs.
- County and municipal governments, with support from Georgia Mountains RDC: regulate septic systems, where the issuing authority enforce of erosion controls for construction, and land use planning.

Specific Management Objectives: Develop water quality standards for nutrients for Lake Lanier following completion of studies.

Management Option Evaluation: A formal evaluation of management options will take place as part of the Lake Lanier Water Quality Cooperative River Basin Study.

Action Plan:

- Complete the Clean Lakes Phase I Diagnostic-Feasibility, URBG modeling, and the Lake Lanier Water Quality Cooperative River Basin Studies, including recommendations for management options.
- Following completion of the studies, EPD will propose nutrient standards for Lake Lanier.
- Nonpoint loading of phosphorus is largely associated with the movement of sediment. Therefore, all the actions for nonpoint sediment and erosion control to be undertaken by agricultural and forestry organizations and local governments and described under Issue C are relevant to nutrient loading.

Method for Tracking Performance: The nutrient management effort for Lake Lanier is designed to protect existing good water quality. Standards will be proposed following completion of the ongoing studies and following adoption of standards monitoring will be done to assess compliance with standards.

Issue E: Water Quantity

Problem Statement: Sufficient surface water quantity to meet the competing demands for drinking water, and other environmental releases, hydropower, recreation, and (downstream) navigation uses may not be available within Lake Lanier and the upstream basin.

General Goals: Provide adequate downstream water releases to meet Georgia's priority needs while maintaining pool levels in Lake Lanier which provide for recreation opportunities and hydropower production, yet anticipate potential future water shortages.

Ongoing Efforts: Water quantity needs and allocations throughout the entire basin are being addressed through the ACT/ACF Study. Projections of future water needs indicate that not all demands can be met under historic conditions of water shortage. Georgia will not agree to an allocation which falls significantly short of its expected needs, though there may be less than optimal quantities of water for some uses during drought conditions.

Identified Gaps and Needs: The models and data bases which have been under development since 1991 must be completed and approved prior to development of an allocation formula.

Strategies for Action: Water quantity issues will be managed in the context of the ACT/ACF allocation process.

Key Participants and Roles:

- Interstate Commission for the ACF Basin is responsible for developing water allocation formula.
- States of Georgia, Alabama, Florida are parties to the ACT/ACF allocation process.

- U.S. Army Corps of Engineers has the primary operational control of flow of water within the basin.

Specific Management Objectives: Maintain pool levels in Lake Lanier which provide for recreation opportunities and hydropower production, yet anticipate potential future water shortages, within the allocation targets developed in the ACT/ACF allocation process.

Management Option Evaluation: During the remainder of 1997 and 1998, the states of Alabama, Florida, and Georgia, together with the Corps of Engineers, will complete the ACT/ACF data base and model development effort and will analyze alternative options for management of the water resources in the Flint and Chattahoochee basins.

Action Plan:

- The Interstate Commission for the ACF Basin will be responsible for developing a water allocation formula by the end of 1998. This formula will include methods for managing the reservoirs, such as Lanier, to meet the needs of the citizens of Georgia. If an allocation agreement is not successfully reached, the issue will likely be decided in a court of law.

Method for Tracking Performance: To be determined.

7.2.2 Hydrologic Unit 03130001, Area B (Buford Dam to Peachtree Creek near Atlanta)

This area of the Chattahoochee River basin runs from the outflow of Lake Lanier to the growing metropolitan Atlanta area. The mainstem of the Chattahoochee supports a unique cold water trout fishery, well south of the normal range for trout, due to releases of cold bottom water from Lake Lanier. The Chattahoochee River National Recreation Area is also located on this segment of the Chattahoochee River. The DeKalb County, Cobb County and Atlanta water intakes, as well as a number of metropolitan Atlanta water pollution control plant discharges are located on this segment of the Chattahoochee River.

The concerns identified for portions of this subbasin include metals concentrations, fecal coliform bacteria, water temperature, dissolved oxygen, erosion and sedimentation, instream flows, and concentrations of PCBs, chlordane and/or mercury in fish tissue.

Issue A: Metals

Problem Statement: The water use classification of fishing was not fully supported in one segment of the Chattahoochee River and in 11 tributary stream segments due to exceedances of water quality standards for metals primarily in the Atlanta metropolitan area. Lead, copper, and zinc standards were exceeded in the river primarily due to urban runoff and zinc, copper, cadmium, and/or lead standards were exceeded in tributary streams also due primarily to urban runoff.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Urban runoff is being addressed in the EPD Stormwater Management Strategy for metropolitan Atlanta. The EPD issued an areawide stormwater permit on 6/15/94 covering

45 municipalities. This strategy will encourage a number of protective measures, as described in Section 7.1.

The Atlanta Regional Commission (ARC) is coordinating stormwater management for local governments in the Atlanta metro area. ARC has established the Regional Stormwater Management Task Force as a forum for cooperative management of stormwater in the metro area, and coordinates stormwater monitoring required for annual reports to EPD. The ARC also expects to develop a water quality management plan for the Atlanta metropolitan region. The plan's purpose is to provide a means for coordinating regional water quality issues and needs with local governments, state and federal agencies, and the public. The final plan will include a GIS-based inventory of water resources and facilities, identification of water quality problems and pollutant sources, and recommendations regarding regional solutions. The plan will serve as a tool to provide technical and general information to the public, elected officials and government staff and to prioritize activities, resources, and funding for prevention or mitigation of water quality impacts.

Finally, ARC addresses urban BMPs through the development review process established by the Georgia Planning Act. As the designated regional planning agency in metropolitan Atlanta, ARC reviews and comments on developments that may have significant regional impacts. In this review process, ARC estimates annual storm water pollutant loads generated from proposed project sites and provides interim guidelines for best management practices for developers and jurisdictions to follow if these projects are approved. It is expected that, when the regional plan is complete, projections from that plan will be used to refine loading estimates and guidelines regarding BMPs. The review process provides an opportunity to promote awareness of BMPs for storm water control, educate elected officials on the need for vigorous erosion and sedimentation controls and storm water management programs, and to encourage improved water quality monitoring in the region.

The City of Atlanta has recently initiated an Urban Watershed Management Program. This program involves two separate watershed studies. The second addresses areas that discharge to the Chattahoochee basin, including Peachtree, Nancy, Proctor, Utoy, and Sandy Creeks. These studies will result in Watershed Water Quality Management Plans that will create a framework for addressing nonpoint source pollution in the watersheds. The first phase will establish goals for water quality improvement and recommend alternatives for meeting the goals. Subsequent phases of the program will include detailed planning and design of water quality enhancements, which may range from stream restoration projects and educational programs to additional pollution control facilities.

Identified Gaps and Needs: The EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, the first step to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Additional biological monitoring may be appropriate to measure impacts along with concentrations of metals. Restoration goals for urban streams are not clearly defined. Consideration should be given to the interaction of metals and habitat degradation: mitigation of metals may have little beneficial impact unless habitat issues are also addressed. It is probable, however, that streams with highly urbanized watersheds cannot be restored to pristine "natural" conditions.

Strategies for Action: Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters; administer stormwater regulations; encourage local efforts to address nonpoint sources of pollution.
- ARC: coordinate stormwater management for the Atlanta metro area.
- Local governments: stormwater management strategies, where issuing authority erosion and sedimentation control enforcement, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Encourage local government watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level using forums such as the Regional Stormwater Task Force.

Action Plan:

- EPD will complete a review of existing metals data in this area by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- EPD will continue to administer the stormwater regulations and will encourage local planning to address stormwater management.
- Local governments under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FY 1999. EPD will review these applications during FY 1999.
- EPD will continue to develop Rapid Bioassessment Protocol capabilities designed to assess impairment of aquatic life.
- EPD will encourage involvement of citizen groups through the Adopt-A-Stream program to address restoration of urban streams.

- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for metals. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- ARC will develop a draft water quality management plan for the Atlanta metro area in FY 1999.
- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: Progress in management of urban stormwater will be tracked through annual reporting required by municipal stormwater permits. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue B: Fecal Coliform Bacteria

Problem Statement: The water use classification of fishing was not fully supported in four Chattahoochee River segments and in 30 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, combined sewer overflows, septic systems, sanitary sewer overflows, and rural nonpoint sources.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Water pollution control plant discharges in this area have generally been compliance with permit limits for fecal coliform bacteria. Combined sewer overflows have historically been a cause of standards violations in the tributary streams to which they discharge. Control strategies for the combined sewer overflows are under construction, as described in Section 4.1.1.2 and should control bacteria concentrations.

The principal source of exceedances of water quality standards for fecal coliform bacteria is urban nonpoint source runoff. Septic tanks and sanitary sewer overflows may also contribute to the problem.

Urban runoff is being addressed in the EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/9 covering 45 municipalities. This will encourage a number of protective measures, as described in Section 7.1.

The Atlanta Regional Commission (ARC) is coordinating stormwater management for local governments in the Atlanta metro area. ARC has established the Regional Stormwater Management Task Force as a forum for cooperative management of stormwater in the area, and coordinates stormwater monitoring required for annual reports to EPD. The ARC also expects to develop a water quality management plan for the Atlanta metropolitan region. The plan's purpose is to provide a means for coordinating regional water quality issues and needs with local governments, state and federal agencies, and the public. The final plan will include a GIS-based inventory of water resources and facilities, identification of water quality problems and pollutant sources, and recommendations regarding regional solutions. The plan will serve as a tool to provide technical and general information to the public, elected officials and government staff and to prioritize activities, resources, and funding for prevention or mitigation of water quality impacts.

Finally, ARC addresses urban best management practices (BMPs) through the development review process established by the Georgia Planning Act. As the designated regional planning agency in metro Atlanta, ARC reviews and comments on developments that may have significant regional impacts. In this review process, ARC estimates annual stormwater pollutant loads generated from proposed project sites and provides interim guidelines for BMPs for developers and jurisdictions to follow if these projects are approved. It is expected that, when the regional plan is complete, projections from that plan will be used to refine loading estimates and guidelines regarding BMPs. The review process provides an opportunity to promote awareness of BMPs for stormwater control, educate elected officials on the need for vigorous erosion and sedimentation controls and stormwater management programs, and to encourage improved water quality monitoring in the region.

The City of Atlanta has recently initiated an Urban Watershed Management Program. This program involves two separate watershed studies. The second addresses areas that discharge to the Chattahoochee basin, including Peachtree, Nancy, Proctor, Utoy, and Sandy Creeks. These studies will result in Watershed Water Quality Management Plans that will create a framework for addressing nonpoint source pollution in the watersheds. The first phase will establish goals for water quality improvement and recommend alternatives for meeting the goals. Subsequent phases of the program will include detailed planning and design of water quality enhancements, which may range from stream restoration projects and educational programs to additional pollution control facilities.

Big Creek is one of the streams in this area listed as partially supporting designated uses with excursions of the fecal coliform bacteria standard. Big Creek is a major tributary to the Chattahoochee River and flows through north Fulton and Forsyth counties, as well as the cities of Alpharetta, Cumming, and Roswell, with a drainage area of 98 mi^2. Recently, the Big Creek Watershed Protection Study was launched to develop a comprehensive approach to address deterioration in stream condition due the effects of urbanization and development. Currently in the preliminary phase, this study will provide a vehicle for local governments in the watershed, assisted by the Atlanta Regional Commission and Georgia Mountains RDC, to work cooperatively to understand the impacts of urbanization on the creek and develop a plan to protect the resource by integrating various elements of watershed protection: local government policies, development guidelines, wetland protection, greenways development, structural facility siting and design, etc. If successful, this effort may serve as a template for initiatives to address urban nonpoint impacts on other streams.

Identified Gaps and Needs: Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal coliform bacteria may be attributable to natural sources (e.g., wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform bacteria sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria. In addition, previous sampling was not conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle will be to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Strategies for Action: Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for October 2001-September 2002, in accordance with the statewide RBMP management cycle.

Key Participants and Roles:

- EPD: monitor and assess use support in listed stream segments; administer CSO control efforts, administer stormwater regulations; regulate point sources under the NPDES program; and encourage local government efforts to address nonpoint source pollution.
- ARC: coordinate stormwater management to the Atlanta metro area.
- Local governments: operate and maintain sewer systems and wastewater treatment plants, stormwater programs, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Local health departments: continue to identify and correct poorly operating septic systems and educate owners about the proper care and maintenance of septic systems.

Specific Management Objectives: Encourage local government watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level using forums such as the Regional Stormwater Task Force.

Action Plan:

- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- EPD will continue to administer the stormwater regulations and CSO control efforts.
- ARC will develop a draft water quality management plan for the Atlanta metro area in FFY 1999.

- Local governments under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FY 1999. EPD will review these applications during FY 1999.
- EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdictions.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December, 2000, in accordance with the statewide RBMP management cycle.

Methods for Tracking Performance: EPD tracks point source discharges through inspections and evaluations of self-monitoring data. Progress in management of urban stormwater will be tracked through annual reporting required by municipal stormwater permits. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue C: Water Temperature

Problem Statement: The segment of the Chattahoochee from Buford Dam to Peachtree Creek is designated as a secondary trout water. The cold temperature is largely governed by patterns of release from Buford Dam. The water use classification of fishing is potentially threatened in this segment due to urban runoff from impervious areas, loss of riparian tree canopy, and water pollution control plant discharges. There are no waters currently listed for excursion of temperature standards in this segment of the river.

General Goals: Meet water quality standards to support water uses.

Ongoing Efforts: Temperature in this reach of the Chattahoochee is controlled by a combination of hydropower operations at Buford Dam, point source discharges, urban runoff, and climate. To fully address these issues, greater understanding of the system is required. Accordingly, EPD initiated a major modeling project, the Chattahoochee River Modeling Project (CRMP), in 1992, designed to provide a general-purpose, time-variable modeling system to represent flow, temperature, dissolved oxygen and nutrients in the mainstem of the Chattahoochee River from Buford Dam to Franklin, Georgia. At this time, all basic model components are in place and preliminary calibration has been achieved (Burke et al., 1997). When calibration is completed, the CRMP will provide an effective tool for evaluating issues related to temperature, dissolved oxygen, and nutrients in this reach of the Chattahoochee. At the request of EPD, the Wildlife Resources Division recently recommended temperature criteria for protecting the tailwater trout fishery from point and nonpoint source impacts.

One way in which warming is mitigated is through the preservation of riparian shade cover. Georgia's Metropolitan River Protection Act contains special provisions for protection of major water supply rivers in metropolitan areas with more than 1,000,000 people. The Act's purposes include water quality protection, control of erosion, and prevention of activities that contribute to flooding. In the Atlanta region, the Act established a river protection corridor within 2,000 feet of both banks of the Chattahoochee River and its impoundments from Buford Dam to Peachtree Creek, and directed ARC to develop a Corridor Plan to protect the land and water resources of the Chattahoochee River Corridor. Criteria contained in the adopted plan include the following: 1) limits on the amount of clearing and impervious surface within the Corridor, based on the vulnerability of the land to development; 2) a 50-foot natural undisturbed vegetative buffer, a 150-foot building setback along the riverbank, and a 35-foot natural undisturbed vegetative buffer along tributaries in the corridor; and 3) controls on river floodplain development.

Identified Gaps and Needs: Effects of land use changes and future development will need to be factored into the development of a long term plan.

Strategies for Action: Managing temperature in the Chattahoochee River requires a detailed understanding of physical processes. This context is being supplied by the ongoing EPD CRMP effort.

Key Participants and Roles:

- EPD: monitor and assess use support in the river; administer stormwater regulations; regulate point sources under the NPDES program; and develop the CRMP model.
- U.S. Army Corps of Engineers: owns and operates Buford Dam.
- ARC: Chattahoochee River Corridor Plan and coordinate stormwater management for the Atlanta metro area.
- Local governments: implement stormwater management strategies and continue operations of water pollution control plants.
- WRD: study habitat requirements of fish populations.

Specific Management Objectives: Meet water quality standards to support designated uses.

Management Option Evaluation: Once calibrated, the CRMP model will provide EPD with the capability to examine tradeoffs among different sources of thermal load. This will help to reach cost-effective solutions designed to maintain the desired temperature regime.

Action Plan:

- EPD will complete calibration of the CRMP model. EPD will use the CRMP model to examine the interaction between dam operations, point source discharges and stormwater inputs. EPD will review alternatives in the next basin planning cycle for maintenance of compliance with the temperature standard.
- EPD will request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits involving significant thermal loading. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth.

Approved watershed management steps will be included as a condition of new or expanded permits.

- Metropolitan Atlanta local governments under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FFY 1998-1999. EPD will review these applications during FFY 1999 and will evaluate whether an assessment of thermal loading in stormwater discharges should be made.

- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Method for Tracking Performance: Monitoring of water temperature at strategic locations along the mainstem of the river.

Issue D: Dissolved Oxygen

Problem Statement: The fishing water use classification was not fully supported in one segment of the Chattahoochee River and in one tributary segment due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the river segment was due to bottom water discharges from Buford Dam, and in the tributary, Clear Creek, was due to nonpoint sources and combined sewer overflows.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Dissolved oxygen in the mainstem of the Chattahoochee River is controlled by a combination of hydropower operations at Buford Dam, point source discharges, urban runoff, and climate. There is also a strong interaction between temperature and dissolved oxygen, as colder water has a higher saturation concentration and thus holds more oxygen. To fully address these issues, greater understanding of the system was required. Accordingly, EPD initiated a major modeling project, the Chattahoochee River Modeling Project (CRMP), in 1992, designed to provide a general-purpose, time-variable modeling system to represent flow, temperature, dissolved oxygen and nutrients in the mainstem of the Chattahoochee River from Buford Dam to Franklin, Georgia. At this time, all basic model components are in place and preliminary calibration has been achieved. When calibration is completed, the CRMP will provide an effective tool for evaluating issues related to temperature, dissolved oxygen, and nutrients in this reach of the Chattahoochee.

Water quality impairment in Clear Creek is being addressed through construction of the Clear Creek CSO treatment facility.

Identified Gaps and Needs: Dissolved oxygen dynamics within this reach represent the net interaction of many sources of oxygen-demanding loads and complex in-river dynamics. The CRMP model provides a tool for evaluating these interactions. Preliminary applications to date confirm the importance of low oxygen levels in Buford dam releases as a contributor to low dissolved oxygen levels in the mainstem of this reach.

Strategies for Action: The EPD will reevaluate dissolved oxygen conditions in Clear Creek following completion of treatment facilities. The Corps of Engineers will work on the assessment and implementation of feasible actions to maintain acceptable dissolved oxygen concentrations in waters released from the dam.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters, administer stormwater regulations, and regulate point sources under the NPDES program.
- The Corps of Engineers: owns and operates the dam.
- ARC: coordination of the Atlanta metro stormwater management.

Specific Management Objectives: Meet water quality standards to support designated water uses.

Management Option Evaluation: The CRMP model will provide EPD with the capability to examine tradeoffs among different components of the dissolved oxygen mass balance. This will help to reach cost-effective solutions designed to maintain the desired dissolved oxygen regime. The Corps of Engineers will evaluate alternatives for improving dissolved oxygen concentrations in releases from Buford Dam.

Action Plan:

- EPD will complete calibration of the CRMP model. EPD will use the CRMP model to examine the interaction between dam operations, point source discharges and stormwater inputs.
- EPD will evaluate and assess use support in listed waters and will work with the Corps to evaluate cost-effective changes in dam operation to improve dissolved oxygen concentrations in releases from Buford Dam.
- The Corps of Engineers will evaluate alternatives to improve dissolved oxygen concentrations in releases from Buford Dam.
- ARC will coordinate stormwater management for the Atlanta metro area.
- Local governments will implement stormwater management strategies and manage operations of water pollution control plants.
- WRD will continue work to study habitat requirements of fish populations.

Methods for Tracking Performance: Monitoring of dissolved oxygen concentrations downstream of the Buford Dam. A reevaluation of the dissolved oxygen issues will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue E: Erosion and Sedimentation

Problem Statement: The water use classification of fishing is potentially threatened in many segments by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. Currently, there is one stream segment listed in this subbasin as partially supporting designated uses due to poor fish community. Sediment may be a factor influencing the fish community in these segments. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture.

General Goals: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Ongoing Efforts: The Metropolitan River Protection Act (MRPA) provides for the protection of a corridor within 2000 feet of the Chattahoochee River between Buford Dam and Peachtree Creek. The MRPA also requires the preparation of local codes and ordinances pertaining to land vulnerability standards, buffer zones adjacent to the Chattahoochee River and tributaries, and floodplain standards. New development must be reviewed by the ARC for compliance with the MRPA and approved by the local governments. Participating local governments include the Cities of Atlanta, Berkeley Lake, Duluth, Roswell, Sugar Hill and Suwanee, and Cobb, Forsyth, Fulton, and Gwinnett Counties. Criteria contained in the adopted plan include the following: 1) limits on the amount of clearing and impervious surface within the Corridor, based on the vulnerability of the land to development; 2) a 50-foot natural undisturbed vegetative buffer, a 150-foot building setback along the riverbank, and a 35-foot natural undisturbed vegetative buffer along tributaries in the corridor; and 3) controls on river floodplain development.

Identified Gaps and Needs: Adverse impacts of excess sediment loading include degradation of habitat and reduction in species diversity. These types of impacts are best addressed through biological monitoring. The stream segment currently listed as partially supporting was based on fish IBI (Index of Biotic Integrity) studies conducted by the WRD in this area of the state. EPD is also developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. The EPD protocols include habitat assessment. These tools provide methods for detecting and quantifying impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

Rural roads are thought to be a contributor to sedimentation but the amount is unclear. Further monitoring may be needed to quantify the impact of rural roads as a source of sedimentation into streams.

A key need for developing strategies to address erosion, sedimentation, and habitat issues in urban streams is definition of appropriate management goals. It is likely that streams with highly urbanized watersheds cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD and other stakeholders.

Strategies for Action: Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Key Participants and Roles:

- EPD and WRD: monitor and assess use support in listed waters; encourage water quality improvement efforts; and continue the development of biomonitoring methods.

- ARC: urban best management practices, the stormwater strategy and provisions of MRPA.
- Local governments: where the issuing authority enforce erosion controls for construction practices and land use planning.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Management Option Evaluation: During this iteration of the basin cycle, management will focus on source control BMPs.

Action Plan:

- EPD and WRD will continue to develop RBMP capabilities designed to assess aquatic life impairment.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- ARC will implement urban best management practices and the stormwater strategy and develop a draft regional water quality management plan for the Atlanta metropolitan area in 1999.
- Local governments delegated the authority for E&S will enforce controls for construction practices.
- The basin team will re-evaluate listed stream status and management strategies during the next basin cycle, scheduled for 2001.

Method for Tracking Performance: During this iteration of the basin cycle, management will focus on source control BMPs. Local governments will track compliance with erosion control measures.

Issue F: Instream Flows

Problem Statement: The water use classifications of fishing and recreation are potentially threatened by inadequate instream flows in the Chattahoochee River mainstem.

General Goals: Maintain adequate flows to support designated water uses. Supply sufficient flows to meet waste assimilation demands in the Atlanta metropolitan area.

Ongoing Efforts: A minimum flow guideline of 750 cfs in the Chattahoochee River at Peachtree Creek is currently in effect to meet waste assimilation demands. This flow target does not, however, necessarily meet fishing and recreational use requirements.

Water quantity needs and allocations throughout the entire basin are being addressed as part of the ACT/ACF study. EPD's Chattahoochee River Modeling Project will provide a general-purpose, time-variable modeling system to represent flow, temperature, dissolved oxygen and nutrients in the mainstem of the Chattahoochee River from Buford Dam to Franklin, Georgia. This model can be used to evaluate the interaction of flow and waste assimilation demands.

Identified Gaps and Needs: A current state requirement for minimum flows is to maintain the 7Q10 flow (7-day average low flow with a once in ten years recurrence interval), when water is available upstream. Consideration is being given to an increase in this minimum flow requirement based on recommendations of WRD (Evans and England, 1995).

Strategies for Action: Mainstem flows are primarily determined by releases from Lake Lanier, which is managed by the Corps of Engineers. Corps management of water resources throughout the basin is subject to a 1990 lawsuit by Alabama against the Corps and a 1992 Memorandum of Agreement between the Corps and the governors of Alabama, Florida, and Georgia. Overall constraints on management of water quantity within the upper basin will likely be determined by the outcome of the ACT/ACF study. EPD and WRD will work with the Corps to determine appropriate instream flow regulation for this section of the Chattahoochee.

Issue G: Fish Consumption Guidelines

Problem Statement: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem from Buford Dam to Morgan Falls Dam and from Morgan Falls Dam to Peachtree Creek. PCBs, mercury, or chlordane were the cause of consumption guidelines in the upper segment of the river and PCBs caused the guidelines in the lower segment of the river. The guidelines are for rainbow trout, carp, largemouth bass, and yellow perch in the upper segment and for carp in the lower segment.

General Goals: Work to protect human health by providing guidelines for consumption of fish.

Ongoing Efforts: DNR has monitored fish in river and the lake and issued fish consumption guidelines. There are no known point source discharges of PCBs or chlordane in the watershed. It is now illegal to manufacture PCBs: however, in the past, these synthetic oils were used regularly as fluids for electrical transformers, cutting oils, and carbonless paper. Although they were banned in 1976, they do not break down easily and remain in sediment for years. Chlordane is a man-made pesticide which was used in the 1940s to the early 1980s as an agricultural pesticide. In 1978 chlordane was restricted to termite control use only. All uses of chlordane were banned in the United States in the 1980s. Chlordane is persistent in the environment and may remain in sediment for many years. Mercury is a naturally occurring metal that recycles between land, water, and air. As mercury cycles through the environment, it is absorbed and ingested by plants and animals. Most of mercury absorbed will be returned to the environment but some will remain in the plant and animal tissues. It is not known where the mercury in fish originated. Mercury may be present in fish due to mercury content in the soils, from municipal and industrial sources, or from fossil fuel use. It is also possible that the mercury is related to global atmospheric transport.

Identified Gaps and Needs: There are no known sources of PCBs or chlordane with in the watershed. Mercury in the area is likely derived from natural sources or from atmospheric deposition.

Strategies for Action: Because the loads of PCBs, chlordane, mercury are not originating from any known point sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

Key Participants Roles:

- EPD and WRD: sample the fish tissue and issue the fish consumption guidelines as appropriate.

Specific Management Objectives: EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

Action Plan:

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this reach will be considered in 2000 in accordance with the river basin monitoring cycle.

7.2.3 Hydrologic Unit 03130002, Area A (Peachtree Creek to West Point Lake) and West Point Lake

This area begins in the densely populated Atlanta metropolitan area and extends to West Point Lake on the Alabama border. The bulk of the Atlanta metropolitan area treated wastewater discharges occur in the upstream end of this HUC. To the south and east of Atlanta, landuse includes significant amounts of silviculture and some agriculture. The most significant water quality problems remaining to be addressed in this area are those associated with urban runoff.

The concerns identified for portions of this subbasin include metals concentrations, fecal coliform bacteria, nutrients, erosion and sedimentation, water temperature and concentrations of PCBs and chlordane in fish.

Issue A: Metals

Problem Statement: The water use classification of fishing was not fully supported in three segments of the Chattahoochee River and in 15 tributary stream segments due to exceedances of water quality standards for metals primarily in the Atlanta metropolitan area. Lead or copper standards were exceeded in the river primarily due to urban runoff and zinc, copper, cadmium, lead and/or mercury standards were exceeded in tributary streams also due primarily to urban runoff.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Urban runoff is being addressed in the EPD Stormwater Management Strategy for metropolitan Atlanta. The EPD issued an areawide stormwater permit on 6/15/94 covering 45 municipalities. This strategy will encourage a number of protective measures, as described in Section 7.1.

The Atlanta Regional Commission (ARC) is coordinating stormwater management for local governments in the Atlanta metro area. ARC has established the Regional Stormwater Management Task Force as a forum for cooperative management of stormwater in the metro area, and coordinates stormwater monitoring required for annual reports to EPD. The ARC also expects to develop a water quality management plan for the Atlanta metropolitan region. The plan's purpose is to provide a means for coordinating regional water quality issues and needs with local governments, state and federal agencies, and the public. The final plan will include a GIS-based inventory of water resources and facilities, identification of water quality problems and pollutant sources, and recommendations regarding regional solutions. The plan will serve as a tool to provide technical and general information to the public, elected officials and government staff and to prioritize activities, resources, and funding for prevention or mitigation of water quality impacts.

Finally, ARC addresses urban BMPs through the development review process established by the Georgia Planning Act. As the designated regional planning agency in metropolitan Atlanta, ARC reviews and comments on developments that may have significant regional impacts. In this review process, ARC estimates annual storm water pollutant loads generated from proposed project sites and provides interim guidelines for best management practices for developers and jurisdictions to follow if these projects are approved. It is expected that, when the regional plan is complete, projections from that plan will be used to refine loading estimates and guidelines regarding BMPs. The review process provides an opportunity to promote awareness of BMPs for storm water control, educate elected officials on the need for vigorous erosion and sedimentation controls and storm water management programs, and to encourage improved water quality monitoring in the region.

The City of Atlanta has recently initiated an Urban Watershed Management Program. This program involves two separate watershed studies. The second addresses areas that discharge to the Chattahoochee basin, including Peachtree, Nancy, Proctor, Utoy, and Sandy Creeks. These studies will result in Watershed Water Quality Management Plans that will create a framework for addressing nonpoint source pollution in the watersheds. The first phase will establish goals for water quality improvement and recommend alternatives for meeting the goals. Subsequent phases of the program will include detailed planning and design of water quality enhancements, which may range from stream restoration projects and educational programs to additional pollution control facilities.

Identified Gaps and Needs: The EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, the first step to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Additional biological monitoring may be appropriate to measure impacts along with concentrations of metals. Restoration goals for urban streams are not clearly defined. Consideration should be given to the interaction of metals and habitat degradation: mitigation of metals may have little beneficial impact unless habitat issues are also addressed. It is probable, however, that streams with highly urbanized watersheds cannot be restored to pristine "natural" conditions.

Strategies for Action: Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters; administer stormwater regulations; encourage local efforts to address nonpoint sources of pollution.
- ARC: stormwater management for the Atlanta metro area.
- Local governments: stormwater management strategies, where the issuing authority erosion and sedimentation control enforcement, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Encourage local government watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level using forums such as the Regional Stormwater Task Force.

Action Plan:

- EPD will complete a review of existing metals data in this area by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- EPD will continue to administer the stormwater regulations and will encourage local planning to address stormwater management.
- Local governments under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FY 1999. EPD will review these applications during FY 1999.
- EPD will continue to develop Rapid Bioassessment Protocol capabilities designed to assess impairment of aquatic life.
- EPD will encourage involvement of citizen groups through the Adopt-A-Stream program to address restoration of urban streams.
- EPD will continue to ensure that permitted point sources remain in compliance with permitted effluent limitations for metals. EPD will also request a comprehensive

watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.

- ARC will develop a draft water quality management plan for the Atlanta metro area in FY 1999.
- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: Progress in management of urban stormwater will be tracked through annual reporting required by municipal stormwater permits. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue B: Fecal Coliform Bacteria

Problem Statement: The water use classification of fishing was not fully supported in three Chattahoochee River segments and in 45 tributary stream segments due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, combined sewer overflows, septic systems, sanitary sewer overflows, and rural nonpoint sources.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Water pollution control plant discharges in this area have generally been in compliance with permit limits for fecal coliform bacteria. Combined sewer overflows have historically been a cause of standards violations in the tributary streams to which they discharge. Control strategies for the combined sewer overflows are under construction, as described in Section 4.1.1.2 and should control bacteria concentrations.

The principal source of exceedances of water quality standards for fecal coliform bacteria is urban nonpoint source runoff. Septic tanks and sanitary sewer overflows may also contribute to the problem.

Urban runoff is being addressed in the EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/9 covering 45 municipalities. This will encourage a number of protective measures, as described in Section 7.1.

The Atlanta Regional Commission (ARC) is coordinating stormwater management for local governments in the Atlanta metro area. ARC has established the Regional Stormwater Management Task Force as a forum for cooperative management of stormwater in the area, and coordinates stormwater monitoring required for annual reports to EPD. The ARC also expects to develop a water quality management plan for the Atlanta metropolitan region. The plan's purpose is to provide a means for coordinating regional water quality issues and needs with local governments, state and federal agencies, and the public. The final plan will include a

GIS-based inventory of water resources and facilities, identification of water quality problems and pollutant sources, and recommendations regarding regional solutions. The plan will serve as a tool to provide technical and general information to the public, elected officials and government staff and to prioritize activities, resources, and funding for prevention or mitigation of water quality impacts.

Finally, ARC addresses urban best management practices (BMPs) through the development review process established by the Georgia Planning Act. As the designated regional planning agency in metro Atlanta, ARC reviews and comments on developments that may have significant regional impacts. In this review process, ARC estimates annual stormwater pollutant loads generated from proposed project sites and provides interim guidelines for BMPs for developers and jurisdictions to follow if these projects are approved. It is expected that, when the regional plan is complete, projections from that plan will be used to refine loading estimates and guidelines regarding BMPs. The review process provides an opportunity to promote awareness of BMPs for stormwater control, educate elected officials on the need for vigorous erosion and sedimentation controls and stormwater management programs, and to encourage improved water quality monitoring in the region.

Identified Gaps and Needs: Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal coliform bacteria may be attributable to natural sources (e.g., wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform bacteria sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria. In addition, previous sampling was not conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle will be to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Strategies for Action: Separate strategies are needed to address nonpoint fecal coliform loading in rural and developed areas.

Urban Areas:

Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for October 2001-September 2002, in accordance with the statewide RBMP management cycle.

Key Participants and Roles:

- EPD: monitor and assess use support in listed stream segments; administer CSO control efforts, administer stormwater regulations; regulate point sources under the NPDES program; and encourage local government efforts to address nonpoint source pollution.
- ARC: coordinate stormwater management to the Atlanta metro area.

- Local governments: operate and maintain sewer systems and wastewater treatment plants, and stormwater regulations, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Local health departments: continue to identify and correct poorly operating septic systems and educate owners about the proper care and maintenance of septic systems.

Specific Management Objectives: Encourage local government watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level using forums such as the Regional Stormwater Task Force.

Action Plan:

- The City of Atlanta will complete sewer separation to eliminate the Utoy Creek combined sewer overflow by late 1998.
- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- Local governments under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FY 1999. EPD will review these applications during FY 1999.
- EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdictions.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.

Methods for Tracking Performance: EPD tracks point source discharges through inspections and evaluations of self-monitoring data. Progress in management of urban stormwater will be tracked through annual reporting required by municipal stormwater permits. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Rural Areas:

Key Participants and Roles:

- EPD: monitor and assess use support in listed streams, encourage local planning efforts, regulate point sources under the NPDES program.
- GSWCC and local SWCDs and RC&D councils with assistance form NRCS: promote implementation of improved agricultural management practices.
- County and municipal governments: septic system regulations, land use planning guidelines.

Specific Management Objectives: Encourage local watershed planning and management sufficient to ensure that designated water uses are supported.

Management Option Evaluation: Evaluation will be on a site-by-site basis. For agricultural BMP support, existing prioritization methods of the agricultural agencies will be used.

Action Plan:

- EPD will continue to ensure that permitted point sources remain in compliance with fecal coliform bacteria limits.
- GSWCC and local agricultural agencies will continue to support adoption of BMPs for animal waste handling. Methods for prioritization and implementation of cost-share incentives under the 1996 Farm Bill are still being worked out, but it is expected that incentives will be targeted to areas of apparent water quality impact, including rural streams which may sustain excessive fecal coliform loads from animal operations.
- DHR is in the process of developing new regulations for septic systems. DHR will work to educate local governments and citizen groups about the need for adequate regulation and maintenance of septic systems to protect water quality.

Method for Tracking Performance: Agricultural agencies will track rates of BMP implementation for animal operations. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue C: Nutrients

Problem Statement: The water use classifications of fishing, drinking water, and recreation are potentially threatened in West Point Lake due to inputs of nutrients which may cause excess algal growth in the lakes. Nutrient sources are upstream water pollution control plant discharges and nonpoint sources from urban and agricultural areas. Water quality standards are in place to address nutrients in West Point Lake. At this time water quality data indicate compliance with standards.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: In the late 1980s the EPD conducted water quality studies of West Point Lake. In 1989, based on the results which showed excess concentrations of phosphorus, the EPD required major metropolitan Atlanta water pollution control plants to reduce phosphorus discharge concentrations to 0.75 mg/l. In the early 1990s the Georgia General Assembly passed legislation banning the use of high phosphate detergents in Georgia. The General Assembly also passed legislation assigning to the DNR the responsibility for establishing water quality standards for West Point Lake. The EPD and the Alabama DEM, using USEPA Clean Water Act funds along with local matching funds from the Calloway Foundation conducted a Phase I Diagnostic-Feasibility Study of West Point Lake. The work was done by contract by LaGrange College, the University of Georgia, and Auburn University. The results of the study were used by the EPD to develop water quality standards for the lake. The Board of Natural Resources adopted standards for the lake in September 1995. The standards include a total phosphorus loading standard for the lake and loading standards for three major tributaries to the lake (see Section 5.2.1). The EPD is monitoring the lake and tributaries to assess compliance with the standards.

Major metropolitan area water pollution control plants have achieved compliance with the phosphorus effluent standards with the exception of the City of Atlanta. The City of Atlanta is under EPD Consent Order to meet the 0.75 mg/l phosphorus limit. In February, 1997 the City of Atlanta is required to achieve compliance with a phosphorus limit of 0.64 mg/l. Failure to achieve compliance will result in Atlanta paying monthly penalties and incurring a sewer connection moratorium. In recent years EPD has required smaller water pollution control plants in the watershed to reduce effluent phosphorus concentration. Orders with compliance schedules for meeting limits are in place for several of these facilities.

EPD is also conducting major water quality modeling projects, supported in part by ARC local government members and the USEPA, on the Chattahoochee River and West Point Lake. The models will provide tools which will be useful in evaluating nutrient loading scenarios and providing much needed technical predictions necessary for future water resource decision making.

Identified Gaps and Needs: Ongoing monitoring will provide information for evaluation of standards compliance.

Strategies for Action: Lake standards adopted for West Point Lake and requirements placed on area wastewater treatment plants along with the stormwater management program for metropolitan Atlanta constitute respectively nutrient loading standards and the strategies for complying with the standards. The EPD is monitoring to assess compliance with the standards. Standards are being met at this time. Should water quality monitoring results indicate exceedence of standards the EPD will evaluate the results and initiate appropriate action.

Issue D: Erosion and Sedimentation

Problem Statement: The water use classification of fishing is potentially threatened in many segments, by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. There are 19 stream segments listed in this subbasin as partially supporting designated uses due to poor fish communities. Sediment may be a factor influencing fish communities in these areas. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture.

General Goals: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Ongoing Efforts: With Section 319(h) FY 94 Grant funds, the City of Atlanta has implemented the Proctor Creek Streambank Restoration and Watershed Management Projects. The Streambank Restoration Project will address sediment loads in Proctor Creek caused by erosion, undercutting, and incision of the stream channel. The objective of the Watershed Management Program is to reduce nonpoint source pollution from urban runoff through public awareness programs, training workshops, and the implementation of best management practices. As of Federal FY 96, a feasibility study has been completed for a demonstration site constituting a 400 foot section of Proctor Creek.

With local funding, the Atlanta Regional Commission (ARC) and the Chattahoochee-Flint Regional Development Commission (CFRDC) have initiated the South Chattahoochee Corridor Plan to create an area-wide development and protection plan for the Chattahoochee River from Peachtree Creek to Franklin, GA. During FY 96, an inventory of existing conditions was completed.

Section V of the Georgia Planning Act requires local governments to develop comprehensive plans for protection of critical natural resources, including water supply watersheds. The Chattahoochee-Flint RDC has developed model ordinances and will target resources toward local adoption of overlay zones to provide protection of water supply watersheds. The River Corridor Protection Act establishes corridors along major rivers as critical natural resources. The Chattahoochee-Flint RDC has also developed a model ordinance for river corridor protection which is applicable to the Chattahoochee River above West Point Lake.

The 1992 GFC compliance survey examined 17 sites in this HUC and found 94% of harvested acreage in compliance with forestry BMPs, but only 73% of road miles in compliance. GFC is targeting education to increase compliance with BMPs for forest roads to reduce erosion.

GSWCC has recently updated, and has made available for distribution, the Manual for Erosion and Sedimentation Control in Georgia, which will be distributed to personnel working on erosion and sedimentation issues throughout the state.

Identified Gaps and Needs: Adverse impacts of excess sediment loading include degradation of habitat and reduction in species diversity. These types of impacts are best addressed through biological monitoring. Stream segments currently listed as partially supporting were based on fish IBI (Index of Biotic Integrity) studies conducted by the WRD in this area of the state. EPD is also developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. The EPD protocols include habitat assessment. These tools provide methods for detecting and quantifying impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

Rural roads are thought to be a contributor to sedimentation but the amount is unclear. Further monitoring may be needed to quantify the impact of rural roads as a source of sedimentation into streams.

A key need for developing strategies to address erosion, sedimentation, and habitat issues in urban streams is definition of appropriate management goals. It is likely that streams with highly urbanized watersheds cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD and other stakeholders.

Strategies for Action: Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Key Participants and Roles:

- EPD and WRD: monitor and assess use support in listed waters; encourage water quality improvement efforts; and continue the development of biomonitoring methods.
- ARC: urban best management practices and coordinate the stormwater strategy.
- Local governments: where the issuing authority enforce erosion controls for construction practices.
- GSSWC and local S&WCDs and RC&Ds with assistance from NRCS: encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC: continue to monitor and encourage implementation of forestry BMPs to control erosion.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Management Option Evaluation: During this iteration of the basin cycle, management will focus on source control BMPs.

Action Plan:

- EPD and WRD will continue to develop RBMP capabilities designed to assess aquatic life impairment.
- EPD will propose a plan for the next basin cycle sampling of streams listed due to poor fish communities and conduct appropriate sampling by December 2000, in accordance with the statewide RBMP management cycle.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- ARC: coordinate urban best management practices and the stormwater strategy.
- The Chattahoochee-Flint RDC and the ARC will assist local governments in adaptation of model ordinances and amendments to local zoning ordinances for water supply watershed protection and river corridor protection during FFY 1998-2001.

- Local governments with issuing authority will enforce erosion controls for construction practices.
- GSSWC will encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC will target landowner and user groups for BMP education to ensure compliance with forestry BMP guidelines.
- The basin team will re-evaluate listed stream status and management strategies during the next basin cycle, scheduled for 2001.

Method for Tracking Performance: GSWCC and GFC will track BMP implementation. Local governments will track erosion and sediment control programs. A reevaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue E: Water Temperature

Problem Statement: The segment of the Chattahoochee from Peachtree Creek to Utoy Creek is designated as a secondary trout water. The water use classification of fishing is not fully supported in this segment due to elevated water temperature associated with wastewater discharges, power plant operation, and urban runoff from impervious areas.

General Goals: Meet water quality standards to support water uses.

Ongoing Efforts: The ongoing efforts identified for HUC 03130001, Area B, Issue C (Section 7.2.2) also apply in this segment.

Identified Gaps and Needs: At this point it is not known whether temperature standards for secondary trout waters are reasonably attainable within this segment.

Strategies for Action: The strategies identified for HUC 03130001, Area B, Issue C also apply in this segment. In addition, this segment is impacted by thermal loads from two wastewater treatment facilities and a coal-fueled electric power plant. EPD will use the CRMP model to evaluate whether NPDES permit limits on thermal loads for these dischargers need to be revised. As part of this effort, EPD will evaluate whether temperature standards for secondary trout waters can be reasonably expected to be attained within this segment. If not, EPD may propose a revision of the use classification for this segment to remove its designation as a secondary trout water.

Issue F: Fish Consumption Guidelines

Problem Statement: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem or in West Point Lake based on fish consumption guidelines due to PCBs and chlordane in the river segment and PCBs in the lake. The guidelines are for largemouth and striped bass, carp, and channel catfish in the river and for largemouth and hybrid bass, carp, and channel catfish in the lake. The use of PCBs and chlordane are banned in the United States.

General Goals: Work to protect human health by providing guidelines for consumption of fish.

Ongoing Efforts: DNR has monitored fish within this segment of the Chattahoochee River and West Point Lake and issued fish consumption guidelines. There are no known point source discharges of PCBs or chlordane in the watershed. It is now illegal to manufacture PCBs: however, in the past, these synthetic oils were used regularly as fluids for electrical transformers, cutting oils, and carbonless paper. Although they were banned in 1976, they do not break down easily and remain in sediment for years. Chlordane is a man-made pesticide which was used in the 1940s to the early 1980s as an agricultural pesticide. In 1978 chlordane was restricted to termite control use only. All uses of chlordane were banned in the United States in the 1980s. Chlordane is persistent in the environment and may remain in sediment for many years.

Identified Gaps and Needs: There are no known sources of PCBs or chlordane with in the watershed.

Strategies for Action: Because the PCBs and chlordane are not originating from any known point sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

Key Participants and Roles:

- EPD and WRD: sample fish tissue and issue the fish consumption guidelines as appropriate.

Specific Management Objectives: EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

Action Plan:

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this reach will be considered in 2000 in accordance with the river basin monitoring cycle.

7.2.4 Hydrologic Unit 03130002, Area B (West Point Dam to Columbus)

The Chattahoochee River in this area forms the Georgia-Alabama border from West Point Dam to the Fall Line just above Columbus, Georgia. Flow of the river in this section is highly controlled by a series of dams. Land use is predominantly rural.

The concerns identified for portions of this subbasin include metals concentrations, fecal coliform bacteria, erosion and sedimentation, low dissolved oxygen, and concentrations of PCBs and chlordane in fish.

Issue A: Metals

Problem Statement: The water use classification of fishing was not fully supported in Long Cane Creek in the LaGrange area and in Goat Rock Lake due to exceedance of the water quality standards for metals. Copper, lead, and zinc standards were exceeded in Long Cane Creek and the copper standard was exceeded in Goat Rock Lake. The metals in Long Cane Creek may be attributed to a combination of effluent from a LaGrange water pollution control plant discharge and urban runoff and in Goat Rock Lake to nonpoint sources. The LaGrange water pollution control plant discharge has been removed from the creek.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Metals concentrations in Long Cane Creek were primarily attributed to the discharge from the LaGrange water pollution control plant. The discharge was diverted to the Chattahoochee River in 9/93. New data are needed to determine current metals concentrations.

Identified Gaps and Needs: The EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, the first step to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded. In the case of Long Cane Creek, additional data need to be collected to determine if metals concentrations continue to be in excess of standards after the discharge was removed. Also, as the watershed includes drainage area in Alabama, Georgia may need to work cooperatively with the Alabama DEM to develop strategies to assess copper in Goat Rock Lake.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Additional biological monitoring may be appropriate to measure impacts along with concentrations of metals.

Strategies for Action: EPD will conduct additional monitoring during the next basin cycle to determine if metals in these two waterbodies continue to exceed water quality standards.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters and encourage local efforts to address nonpoint sources of pollution.
- Local governments: stormwater management strategies, erosion and sedimentation control, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Meet water quality standards to support designated uses. Initial work will be to conduct additional sampling to determine if metals concentrations continue to exceed water quality standards.

Management Option Evaluation: Options will be evaluated following analysis of future sampling results.

Action Plan:

- EPD will complete a review of existing metals data in listed segments by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling of the listed waters and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: To be proposed as strategies are refined.

Issue B: Fecal Coliform Bacteria

Problem Statement: The water use classification of fishing was not fully supported in five stream segments in the LaGrange area and three stream segments in rural areas due to exceedances of the water quality standard for fecal coliform bacteria. These may be attributed to a combinations of urban runoff, septic systems, sanitary sewer overflows, agriculture, rural nonpoint, and natural sources.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: None identified.

Identified Gaps and Needs: Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal coliform bacteria may be attributable to natural sources (e.g., wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria. In addition, previous sampling has not been conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle may be to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Strategies for Action: Separate strategies are needed to address nonpoint fecal coliform loading for urban and agricultural sources.

Urban Areas:

Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for October 2001-September 2002, in accordance with the statewide RBMP management cycle.

Key Participants and Roles:

- EPD: monitor and assess use support in listed stream segments and encourage local efforts to address nonpoint source pollution.
- Local governments: operate and maintain sewer systems and wastewater treatment plants, develop stormwater programs, monitor land application systems, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Local health departments: continue to identify and correct poorly operating septic systems and educate owners about the proper care and maintenance of septic tank systems.

Specific Management Objective: Encourage local watershed planning and management sufficient to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level.

Action Plan:

- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- EPD will encourage local planning to address stormwater management.
- EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdictions.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December, 2000, in accordance with the statewide RBMP management cycle.

Methods for Tracking Performance: EPD tracks point source discharges through inspections and evaluations of self-monitoring data. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Rural Areas:

Key Participants and Roles:

- EPD: monitor and assess use support in listed streams, encourage local planning efforts, and regulate point sources under the NPDES program.
- GSWCC and local SWCDs and RC&D councils with assistance form NRCS: promote implementation of agricultural management practices.
- County and municipal governments: septic system regulations, land use planning guidelines.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives : Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Evaluation will be on a site-by-site basis. For agricultural BMP support, existing prioritization methods of the agricultural agencies will be used.

Action Plan:

- EPD will continue to ensure that permitted point sources remain in compliance with fecal coliform bacteria limits.
- GSWCC and local agricultural agencies will continue to support adoption of BMPs for animal waste handling. Methods for prioritization and implementation of cost-share incentives under the 1996 Farm Bill are still being worked out, but it is expected that incentives will be targeted to areas of apparent water quality impact, including rural streams which may sustain excessive fecal coliform loads from animal operations.
- DHR is in the process of developing new regulations for septic systems. DHR will work to educate local governments and citizen groups about the need for adequate regulation and maintenance of septic systems to protect water quality.

Method for Tracking Performance: Agricultural agencies will track rates of BMP implementation for animal operations. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue C: Erosion and Sedimentation

Problem Statement: The water use classification of fishing is potentially threatened by erosion and loading of sediment, which can alter stream morphology, impact habitat, reduce water clarity, and clog drinking water systems. Sediment may be a factor influencing fish communities in these areas. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

General Goals: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Ongoing Efforts: GSWCC has recently updated, and has made available for distribution, the Manual for Erosion and Sedimentation Control in Georgia, which will be distributed to personnel working on erosion and sedimentation issues throughout the state.

The 1992 GFC compliance survey examined 17 sites in this HUC and found 94% of harvested acreage in compliance with forestry BMPs, and 73% of road miles in compliance. GFC is targeting education to increase compliance with BMPs for forest roads to reduce erosion.

Identified Gaps and Needs: Adverse impacts of excess sediment loading include degradation of habitat and reduction in species diversity. These types of impacts are best addressed through biological monitoring. EPD is developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. The EPD protocols include habitat assessment. The WRD is working with the IBI (Integrated Biotic Index) to assess fish communities. These tools will provide methods to detect and quantify impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

Rural roads are thought to be a significant contributor to sedimentation but the magnitude of this contribution is unclear. Further monitoring may be needed to quantify the impact of rural roads as a source of sedimentation into streams.

A key need for developing strategies to address erosion, sedimentation, and habitat issues in urban streams is definition of appropriate management goals. It is likely that streams with highly urbanized watersheds cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD and other stakeholders.

Strategies for Action: Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Key Participants and Roles:

- EPD and WRD: monitor and assess use support in listed waters; encourage water quality improvement efforts; and continue the development of biomonitoring methods.
- Local governments: where the issuing authority enforce erosion controls for construction practices and land use planning.
- GSSWC and local S&WCDs and RC&Ds with assistance from NRCS: encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC: continue to monitor and encourage implementation of forestry BMPs to control erosion.

- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Management Option Evaluation: During this iteration of the basin cycle, management will focus on source control BMPs.

Action Plan:

- EPD and WRD will continue to develop RBP capabilities designed to assess aquatic life impairment.
- EPD will propose a plan for the next basin cycle sampling of streams listed due to poor fish communities and conduct appropriate sampling by December 2000, in accordance with the statewide RBMP management cycle.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- The basin team will re-evaluate listed stream status and management strategies during the next basin cycle, scheduled for 2001.
- Local governments with the issuing authority will enforce erosion controls for construction practices.
- GSSWC will encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC will target landowner and user groups for BMP education to ensure compliance with forestry BMP guidelines.

Method for Tracking Performance: GSWCC and GFC will track BMP implementation. Local governments with the issuing authority, will track erosion and sediment control programs. A reevaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue D: Dissolved Oxygen

Problem Statement: The fishing water use classification was not fully supported in one segment of the Chattahoochee River and in two tributary segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the river segment was due to bottom water discharges from West Point Lake and in the tributaries due to nonpoint sources.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: The Corps of Engineers conducts ongoing monitoring of water quality of releases from West Point Dam and is considering alternatives to improve dissolved oxygen concentrations. One tributary with low dissolved oxygen was Long Cane Creek. The LaGrange water pollution control plant discharge to Long Cane Creek was removed in 9/93.

Identified Gaps and Needs: Causes of low dissolved oxygen in Ollie Creek are uncertain at this time.

Strategies for Action: The Corps of Engineers will work on the assessment and implementation of feasible actions to maintain acceptable dissolved oxygen concentrations in waters released from the dam.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters.
- The Corps of Engineers: owns and operates the dam.

Specific Management Objectives: Meet water quality standards to support designated water uses.

Management Option Evaluation: The Corps of Engineers will evaluate alternatives for improving dissolved oxygen concentrations in releases from West Point dam.

Action Plan:

- The EPD will monitor and assess use support in listed waters and will work with the Corps to evaluate cost-effective changes in dam operation to improve dissolved oxygen concentrations in releases from West Point Dam.
- The Corps of Engineers will evaluate alternatives in dam operations to improve dissolved oxygen concentrations in releases from West Point Dam.

Methods for Tracking Performance. A reevaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue E: Fish Consumption Guidelines

Problem Statement: The water use classification of fishing was not fully supported in Lake Harding, Goat Rock Lake, and Lake Oliver based on fish consumption guidelines. PCBs and mercury were the cause of consumption guidelines. The guidelines are for largemouth and hybrid bass, channel catfish, crappie, black crappie, catfish, and spotted sucker.

General Goals: Work to protect human health by providing guidelines for consumption of fish.

Ongoing Efforts: DNR has monitored fish in Lake Harding, Goat Rock Lake, and Lake Oliver and issued fish consumption guidelines. There are no known point source discharges of PCBs in the watershed. It is now illegal to manufacture PCBs: however, in the past, these synthetic oils were used regularly as fluids for electrical transformers, cutting oils, and carbonless paper. Although they were banned in 1976, they do not break down easily and remain in sediment for years.

Identified Gaps and Needs: There are no known sources of PCBs within the watershed. Mercury within Lake Oliver is likely derived from natural sources or from atmospheric deposition.

Strategies for Action: Because the loads of PCBs and mercury are not originating from any known point sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

Key Participants and Roles:

- EPD and WRD: sample the fish tissue and issue the fish consumption guidelines as appropriate.

Specific Management Objectives: EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

Action Plan:

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this reach will be considered in 2000 in accordance with the river basin monitoring cycle.

Method of Tracking Performance: Trends in fish tissue concentration; number of fish consumption guidelines required.

7.2.5 Hydrologic Unit 03130003 (Columbus to Lake W. F. George)

This area begins in the urban area of Columbus at the Fall Line and extends through Lake Walter F. George. Land use below Columbus is primarily rural, with significant amounts of agricultural and silvicultural land use. A large part of the direct drainage to this area is located in Alabama.

The concerns identified for portions of this subbasin include metals concentrations, fecal coliform bacteria, erosion and sedimentation, nutrients, and concentrations of PCBs and chlordane in fish tissue.

Issue A: Metals

Problem Statement: The water use classification of fishing was not fully supported in 11 river tributary stream segments in the Columbus area due to exceedance of the water quality standard for copper. Copper and lead standards were also exceeded in the Chattahoochee River below Columbus. The metals may be attributed to urban runoff.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Columbus has implemented a program to treat discharges from combined sewer overflows (CSOs) The plan includes continued release with solids separation and disinfection at two overflow locations which may continue to introduce some intermittent metals loads into the Chattahoochee. In addition, The City of Columbus, working through the Water Environment Federation, received a $20 million grant from USEPA to conduct a full-scale research project to test the effectiveness of various combination of vortex separation, dissolved air Flotation, and UV disinfection on CSOs. This work was recently completed and will result in improved control of residual loads from Columbus CSOs. It will also provide valuable information to be shared with other U.S. communities developing plans for CSO control.

EPD issued a NPDES Municipal Separate Storm Sewer Systems (MS4) Discharge Permit to the Columbus Consolidated Government on April 20, 1995. This permit requires the Consolidated Government to implement a storm water management program to address the discharge of pollutants from their storm sewer system to the Chattahoochee River basin. This program is now in its third year. The management program includes structural controls and best management practices for reducing runoff pollution from public, residential, commercial, and industrial areas. Illicit discharge detection, wet and dry weather monitoring, public education, and citizen involvement are important components of this management program, and a comprehensive Storm Water Management Ordinance (Council Resolution 97-33) was adopted in April, 1997. A committee of concerned stakeholders will aid in the development of a Storm Water Design Manual for addressing long-term storm water control in the Columbus area.

Identified Gaps and Needs: EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, the first step to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded. Also, as the watershed includes significant drainage area in Alabama, Georgia will need to work cooperatively with the Alabama DEM to develop strategies to assess metal concentrations in the river.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Additional biological monitoring may be appropriate to measure impacts along with concentrations of metals. Restoration goals for urban streams are not clearly defined. Consideration should be given to the interaction of metals and habitat degradation: mitigation of metals may have little beneficial impact unless habitat issues are also addressed. It is probable, however, that streams with highly urbanized watersheds cannot be restored to pristine "natural" conditions.

Strategies for Action: Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation.

Key Participants and Roles:

- EPD: monitor and assess use support in listed waters; administer stormwater regulations; encourage local efforts to address nonpoint sources of pollution.

- Local governments: stormwater management strategies, erosion and sedimentation control enforcement, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Encourage local government watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level.

Action Plan:

- EPD will complete a review of existing metals data in listed segments by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling of streams identified as not supporting or partially supporting designated uses and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- EPD will continue to administer the stormwater regulations and will encourage local planning to address stormwater management.
- The Columbus Consolidated Government under the Phase I stormwater program will submit annual reports and apply for renewal of existing permits in FY 1999. EPD will review these applications during FY 1999.
- EPD will continue to develop Rapid Bioassessment Protocol capabilities designed to assess impairment of aquatic life.
- EPD will encourage involvement of citizen groups through the Adopt-A-Stream program to address restoration of urban streams.
- The basin team will re-evaluate stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: Progress in management of urban stormwater will be tracked through annual reporting required by municipal stormwater permits. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue B: Fecal Coliform Bacteria

Problem Statement: The water use classification of fishing was not fully supported in seven stream segments due to exceedances of the water quality standard for fecal coliform bacteria. Elevated fecal coliform bacteria concentrations in the Chattahoochee River (two segments) downstream of Columbus may be attributed to CSOs and urban runoff. Urban runoff is the likely source of violations in four river tributaries in the Columbus area and rural nonpoint sources the source of violations in two tributaries to Lake Walter F. George.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: Wastewater treatment facilities within this area are in compliance with permit limits for fecal coliform bacteria.

Excursions of water quality standards associated with Columbus CSOs have been mitigated by solids removal and disinfection at remaining outfalls. Columbus has implemented a program to treat discharges from combined sewer overflows (CSOs). The plan includes continued release with solids separation and disinfection at two overflow locations which may continue to introduce some intermittent bacteia loads into the Chattahoochee. In addition, the City of Columbus, working through the Water Environment Federation, received a $20 million grant from USEPA to conduct a full-scale research project to test the effectiveness of various combination of vortex separation, dissolved air Flotation, and UV disinfection on CSOs. This work was recently completed and will result in improved control of residual loads from Columbus CSOs. It will also provide valuable information to be shared with other U.S. communities developing plans for CSO control.

EPD issued a NPDES Municipal Separate Storm Sewer Systems (MS4) Discharge Permit to the Columbus Consolidated Government on April 20, 1995. This permit requires the Consolidated Government to implement a storm water management program to address the discharge of pollutants from their storm sewer system to the Chattahoochee River Basin. This program is now in its third year. The management program includes structural controls and best management practices for reducing runoff pollution from public, residential, commercial, and industrial areas. Illicit discharge detection, wet and dry weather monitoring, public education, and citizen involvement are important components of this management program, and a comprehensive Storm Water Management Ordinance (Council Resolution 97-33) was adopted in April, 1997. A committee of concerned stakeholders will aid the Consolidated Government in developing a Storm Water Design Manual for addressing long-term storm water control in the Columbus area.

Identified Gaps and Needs: Sources of fecal coliform bacteria in many stream segments are not clearly defined. In some cases, fecal coliform bacteria may be attributable to natural sources (e.g., wildlife); alternative bacteriological sampling methods may be useful to distinguish between human, other mammalian, and avian fecal coliform sources. Sanitary sewer leaks and overflows may be a source of fecal coliform bacteria. As the watershed includes significant drainage area in Alabama, Georgia will need to work cooperatively with the Alabama DEM to develop strategies to reduce fecal coliform bacteria levels in the river. In addition, previous sampling was not conducted at a sufficient frequency to determine whether the monthly geometric mean criterion specified in the standard has actually been violated. Thus, an initial effort in the next RBMP cycle may be to collect an adequate number of samples (four over a 30-day period) to support geometric mean calculations to determine if water quality standards are actually being exceeded.

Strategies for Action: Separate strategies are needed to address nonpoint fecal coliform loading for urban and agricultural sources.

Urban Areas:

Addressing urban runoff will be a complex task, requiring a strong local component. Management of urban runoff is needed to address a variety of water quality problems, including metals, fecal coliform bacteria, nutrients, and habitat degradation. For this five year phase of the basin management cycle, management will concentrate on source control and planning. Evaluation of the efficacy of this approach will be made during the basin strategy re-evaluation scheduled for October 2002-September 2003, in accordance with the statewide RBMP management cycle.

Key Participants and Roles:

- EPD: monitor and assess use support in listed stream segments; administer CSO control efforts; and encourage local efforts to address nonpoint source pollution.
- Local governments: operate and maintain sewer systems and wastewater treatment plants, monitor land application systems, and stormwater programs, zoning and land use planning, local watershed initiatives, and monitoring programs.
- Local health departments: continue to identify and correct poorly operating septic systems and educate owners about the proper care and maintenance of septic tank systems.

Specific Management Objectives: Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Integrated management options will be proposed and evaluated primarily at the local level.

Action Plan:

- EPD will continue to ensure that all permitted point sources remain in compliance with permitted effluent limitations for fecal coliform bacteria. EPD will also request a comprehensive watershed assessment, looking at both point and nonpoint sources, from localities applying for new or expanded NPDES point source discharge permits. The intent is to direct localities' attention to current and future nonpoint source issues in their watershed and to have them consider ways to prevent or control water quality impacts due to growth. Approved watershed management steps will be included as a condition for expansion of existing water pollution control plants or construction of new plants.
- EPD will continue to administer the stormwater program and encourage local planning to address stormwater management.
- EPD will encourage local authorities to institute programs to identify and address illicit sewage discharges, leaks and overflows of sanitary sewers, and failing septic tanks within their jurisdictions.
- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- EPD will complete reassessment of fecal coliform bacteria monitoring protocols and will propose a plan for resampling of streams identified as not supporting or partially

supporting designated uses and complete sampling by December, 2000, in accordance with the statewide RBMP management cycle.

Methods for Tracking Performance: EPD tracks point source discharges through inspections and evaluations of self-monitoring data. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Rural Areas:

Key Participants and Roles:

- EPD: monitor and assess use support in listed streams, ecourage local planning efforts, regulate point sources under the NPDES program.
- GSWCC and local SWCDs and RC&D councils with assistance form NRCS: promote implementation of agricultural management practices.
- County and municipal governments: septic system regulations, and land use planning guidelines.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Encourage local watershed planning and management to ensure that designated water uses are supported.

Management Option Evaluation: Evaluation will be on a site-by-site basis. For agricultural BMP support, existing prioritization methods of the agricultural agencies will be used.

Action Plan:

- EPD will continue to ensure that all permitted point sources remain in compliance with fecal coliform bacteria limits.
- GSWCC and local agricultural agencies will continue to support adoption of BMPs for animal waste handling. Methods for prioritization and implementation of cost-share incentives under the 1996 Farm Bill are still being worked out, but it is expected that incentives will be targeted to areas of apparent water quality impact, including rural streams which may sustain excessive fecal coliform loads from animal operations.
- DHR is in the process of developing new regulations for septic systems. DHR will work to educate local governments and citizen groups about the need for adequate regulation and maintenance of septic systems to protect water quality.

Method for Tracking Performance: Agricultural agencies will track rates of BMP implementation for animal operations. An evaluation of the status of listed waterbodies will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue C: Erosion and Sedimentation

Problem Statement: The water use classifications of fishing and recreation are potentially threatened in waterbodies by erosion and loading of sediment, which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

General Goals: Control erosion and sedimentation from land disturbing activities in order to meet water quality standards for turbidity.

Ongoing Efforts: GSWCC has recently updated, and has made available for distribution, the *Manual for Erosion and Sedimentation Control in Georgia*, which will be distributed to personnel working on erosion and sedimentation issues throughout the state.

GFC conducted a BMP compliance survey in 1992 on 10 sites in this HUC and documented found 95% of harvested acreage in compliance with BMPs, and 70% of forest roads in compliance. GFC is targeting education to increase compliance with BMPs for forest roads to reduce erosion.

Identified Gaps and Needs: Adverse impacts of excess sediment loading include degradation of habitat and reduction in species diversity. These types of impacts are best addressed through biological monitoring. EPD is developing increased capability for biomonitoring using Rapid Bioassessment Protocols (RBPs) for benthic macroinvertebrates. The EPD protocols include habitat assessment. The WRD is working with the IBI (Integrated Biotic Index) to assess fish communities. These tools will provde methods to detect and quantify impairment of aquatic life resulting from habitat-modifying stressors such as sediment, as well as impacts from other stressors.

Rural roads are thought to be a significant contributor to sedimentation but the amount is unclear. Further monitoring may be needed to quantify the impact of rural roads as a source of sedimentation into streams.

A key need for developing strategies to address erosion, sedimentation, and habitat issues in urban streams is definition of appropriate management goals. It is likely that streams with highly urbanized watersheds cannot be returned to "natural" conditions. An appropriate restoration goal needs to be established in consultation between EPD and other stakeholders.

Strategies for Action: Understanding the role of erosion and sedimentation in urban streams is incomplete at this time. Most of these streams are impacted by a variety of stressors. An incremental or phased approach is needed to address these issues.

Key Participants and Roles:

- EPD: encourage local government water quality improvement efforts; and continue the development of biomonitoring methods.
- Local governments: where the issuing authority enforce erosion controls for construction practices and land use planning.

- GSSWC: continue to monitor and encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC: encourage implementation of forestry BMPs to control erosion.
- Citizen groups: Adopt-A-Stream programs and work with local governments on watershed initiatives.

Specific Management Objectives: Control erosion and sedimentation from land disturbing activities in order to meet water qualilty standards for turbidity.

Management Option Evaluation: During this iteration of the basin cycle, management will focus on source control BMPs.

Action Plan:

- EPD will encourage citizen involvement through Adopt-A-Stream groups to address restoration of urban streams.
- Local governments with the issuing authority will enforce erosion controls for construction practices.
- GSSWC will encourage the implementation of BMPs to control erosion of agricultural lands.
- GFC will target landowner and user groups for BMP education to encourage compliance with forestry BMP guidelines.
- EPD and WRD will continue to develop biological monitoring capabilities designed to assess aquatic life.

Method for Tracking Performance: GSWCC and GFC will track BMP implementation.

Issue D: Nutrients

Problem Statement: The water use classification of recreation is potentially threatened in Lake Walter F. George due to inputs of nutrients which may cause excess algal growth in the lake. Potential sources may include municipal or industrial point source discharges or nonpoint sources from urban runoff or agriculture.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: A joint Feasibility Study report, prepared by the EPD and Alabama DEM in 1996, concluded the reservoir was in relatively good condition. No water use impacts were documented. The trophic status was, however, documented as eutrophic, so prevention of further degradation is advisable. Therefore, the management of nutrient loading, particularly phosphorus, is an important long-term objective in maintaining the current water quality. On November 6, 1996, the Rules and Regulations for Water Quality Control, Chapter 391-3-6, were revised to include specific water quality standards for Walter F. George. These standards include limits on chlorophyll *a*, pH, total nitrogen, phosphorus loading, fecal coliform bacteria, and dissolved oxygen in the lake and on phosphorus loading to the lake from the Chattahoochee River. Monitoring for compliance with these standards began in 1997.

Identified Gaps and Needs: Monitoring over time will document water quality and status of compliance with water quality standards.

Strategies for Action: The water quality standards for Lake Walter F. George constitute the strategy for protection of the lake. Monitoring over time will document the status of compliance with water quality standards. If compliance with standards is not maintained strategies will be developed to assess and manage point and nonpoint nutrient sources.

Issue E: Fish Consumption Guidelines

Problem Statement: The water use classification of fishing was not fully supported in the Chattahoochee River mainstem (Oliver Dam to Chattahoochee County) and in Lake Walter F. George based on fish consumption guidelines. PCBs were the cause of the consumption guidelines in the river and mercury, PCBs, and chlordane caused the guidelines in the lake. The guidelines are for channel catfish in the river and for largemouth bass, hybrid bass, and catfish in the lake.

General Goals: Work to protect human health by providing guidelines for consumption of fish.

Ongoing Efforts: DNR has monitored fish in river and the lake and issued fish consumption guidelines. There are no known point source discharges of PCBs, chlordane or mercury in the watershed. It is now illegal to manufacture PCBs: however, in the past, these synthetic oils were used regularly as fluids for electrical transformers, cutting oils, and carbonless paper. Although they were banned in 1976, they do not break down easily and remain in sediment for years. Chlordane is a man-made pesticide which was used in the 1940s to the early 1980s as an agricultural pesticide. In 1978 chlordane was restricted to termite control use only. All uses of chlordane were banned in the United States in the 1980s. Chlordane is persistent in the environment and may remain in sediment for many years. Mercury is a naturally occurring metal that recycles between land, water, and air. As mercury cycles through the environment it is absorbed and ingested by plants and animals. Most of mercury absorbed will be returned to the environment but some will remain in the plant and animal tissues. It is not known where the mercury in fish originated. Mercury may be present in fish due to mercury content in the soils, from municipal and industrial sources, or from fossil fuel use. It is also possible that the mercury is related to global atmospheric transport.

Identified Gaps and Needs: There are no known sources of loads of PCBs or chlordane in the watershed. Mercury in the area is likely derived from natural sources or from atmospheric deposition.

Strategies for Action: Because the PCBs, chlordane, or mercury are not originating from any known point sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

Key Participants:

- EPD and WRD: sample the fish tissue and issue the fish consumption guidelines as appropriate.

Specific Management Objectives: EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

Action Plan:

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this reach will be considered in 2000 in accordance with the river basin monitoring cycle.

7.2.6 Hydrologic Unit 03130004 (Lake W. F. George to Lake Seminole)

The southernmost portion of the Chattahoochee River basin runs from the Lake Walter F. George Dam to Lake Seminole, and contains parts of Georgia, Alabama, and Florida. The land area within Georgia is relatively small and sparsely populated.

The concerns identified for portions of this subbasin include metals concentrations, dissolved oxygen, nuisance weeds, and concentrations of mercury in fish.

Issue A: Metals

Problem Statement: The water use classification of recreation was not fully supported in one segment of the Chattahoochee River due to exceedance of the water quality standard for lead from nonpoint sources.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: None identified.

Identified Gaps and Needs: The EPD is concerned with the accuracy of many of the stream assessments showing criteria violations for metals, as, in many cases, the metals database was minimal with as little as one data point showing a concentration in excess of stream standards. Further, there are quality assurance concerns with much of the earlier metals data, as it is now evident that clean and ultra clean techniques for sample collection and laboratory testing are necessary to produce quality assured data. Thus, an initial effort to address this issue will be to collect additional samples using clean techniques to determine if water quality standards are actually being exceeded.

It is also unclear how occasional standards violations translate into actual risk to aquatic life. Georgia standards for metals may need to be reevaluated in light of recent EPA guidance on use of the dissolved fraction of total metal concentrations to calculate risk to aquatic life. Biological monitoring may be appropriate to measure impacts along with concentrations of metals.

Strategies for Action: The strategy to address lead will focus on a better definition of the existence and extend of the problem.

Key Participants and Roles:

- EPD: monitor and assess use support in the listed water. Identification of other participants will depend on the confirmation of a problem and any potential causes.

Specific Management Objectives: EPD will monitor to document lead concentrations in this segment of the Chattahoochee River. If data show lead to be an issue, options will be developed to assess sources and potential control alternatives.

Management Option Evaluation: Not applicable at this time.

Action Plan:

- EPD will complete a review of existing metals data in the listed water by September 1999, in accordance with the statewide RBMP management cycle.
- EPD will propose a plan for resampling this segment of the Chattahoochee River and complete sampling by December 2000, in accordance with the statewide RBMP management cycle.
- The basin team will re-evaluate listed stream status and management strategies during the next basin cycle, scheduled for 2001.

Methods for Tracking Performance: An evaluation of the status of the listed segment of the river will be made coincident with the next iteration of the RBMP management cycle for the Chattahoochee River basin in 2001.

Issue B: Dissolved Oxygen

Problem Statement: The fishing water use classification was not fully supported in a segment of the Chattahoochee River downstream of the dam at Walter F. George due to dissolved oxygen concentrations. The low concentrations of dissolved oxygen are a result of releases of bottom water from the dam.

General Goals: Meet water quality standards to support designated water uses.

Ongoing Efforts: In 1993, the Corps of Engineers adopted a Standard Operating Procedure (SOP) that includes a system to detect low oxygen conditions and sound an alarm. When the alarm sounds, water is spilled from the surface of the reservoir to increase the oxygen levels. Under this SOP, oxygen in the tailrace must get below 2 ppm before the alarm is triggered. The Corps is also concerned with safety issues and sediment loading caused by seepage problems at the dam.

Identified Gaps and Needs: None identified.

Strategies for Action: The EPD will work with Corps of Engineers to assess and implement feasible actions to maintain acceptable dissolved oxygen concentrations. The COE plans to implement a rehabilitation project of the W. F. George Lock and Dam during FFY 1999/2000. The rehabilitation project will deal with the seepage problems at the day.

Issue C: Nuisance Weeds

Problem Statement: The water use classifications of fishing and recreation are threatened in Lake Seminole due to the presence of nuisance aquatic plant species.

General Goals: Monitor and manage the populations of nuisance aquatic plants.

Ongoing Efforts: The U.S. Army Corps of Engineers uses several methods in attempting to control nuisance plant growth in Lake Seminole. The Corps has proposed an integrated strategy involving traditional herbicide treatments, confined release of triploid grass carp, a herbicide drip system in Spring Creek, and experimental plantings of native vegetation.

Identified Gaps and Needs: Work should be continued by the Corps to inventory aquatic weed populations in the lake.

Strategies for Action: Nuisance weeds will be addressed through continuation of the existing COE control programs. WRD will provide assistance as needed.

Issue D: Fish Consumption Guidelines

Problem Statement: The water use classification of fishing was not fully supported in Lake Seminole based on fish consumption guidelines due to mercury. The guidelines are for bullhead.

General Goals: Work to protect human health by providing guidelines for consumption of fish.

Ongoing Efforts: DNR has monitored fish in Lake Seminole and issued a fish consumption guideline. There are no known point source discharges of mercury into the Lake Seminole watershed.

Identified Gaps and Needs: Mercury is a naturally occurring metal that recycles between land, water, and air. As mercury cycles through the environment, it is absorbed and ingested by plants and animals. Most of mercury absorbed will be returned to the environment but some will remain in the plant and animal tissues. It is not known where the mercury in fish originated. Mercury may be present in fish due to mercury content in the soils, from municipal and industrial sources, or from fossil fuel use. It is also possible that the mercury is related to global atmospheric transport.

Strategies for Action: Because the source of mercury is not originating from any known point sources, the strategy is to keep the fishing public notified of risks associated with fish consumption.

Key Participants:

- EPD and WRD: sample the fish tissue and issue the fish consumption guidelines as appropriate.

Specific Management Objectives: EPD and WRD will work to protect public human health by issuing fish consumption guidelines as needed, indicating the recommended rates of consumption of fish from specific waters. The guidelines are based on conservative assumptions and provide the public with factual information for use in making rational decisions regarding fish consumption.

Action Plan:

- WRD and EPD will continue to sample and analyze fish tissue and issue fish consumption guidelines as needed. The next round of fish tissue sampling for this reach will be considered in 2000 in accordance with the river basin monitoring cycle.

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Section 8

Future Issues and Challenges

8.1 The Need for Continuing and Adaptive Management

Basin Management is Never-Ending

This plan constitutes another step in management of the water resources in the Chattahoochee River Basin, but not the final step. It is important for all to understand that there will never be a final step. Management is ongoing and dynamic because changes in resource use and condition occur continually, as do changes in management resources and perspectives. Therefore, management planning and implementation must remain flexible and adapt to changing needs and capabilities.

We’ve Done Well....But There is More to Do

For the past few decades, management efforts have resulted in substantial improvements in water quality, and reduction in pollutant loading for many waters (see examples in Section 4). Much of these improvements stem from increased wastewater treatment at municipalities and industries, and from implementation of best management practices by landowners that help reduce soil and contamination runoff. Indeed, many of the waterbodies in the basin are fully supporting their designated uses. The assessments summarized in this plan show, however, that not all waters are at the level of quality deemed necessary to support designated uses. There are existing waters still in need of restoration and attention beyond existing management efforts.

Today’s Issues Require Actions by Many Different Stakeholders

The current and proposed strategies summarized in this plan do not “solve” all existing problems. Many of the unsolved problems will require actions by stakeholders other than those that have been involved in planning to date. For example, resolution of fecal coliform bacteria problems will typically require local government (e.g., eliminating leaking and overflowing sanitary sewers) and private landowner actions (e.g., correcting failed septic systems; using best management practices in animal operations and land application of waste residuals). Other issues will require significant additional time and effort before they are addressed sufficiently (e.g., restoration of riparian zones and aquatic habitat). Some of these issues may require trial management efforts and adapting those efforts over time based on observations of what works well, particularly where there is no 100 percent effective solution evident at the time of strategy development. Future management should focus on the priorities among these continuing needs, as determined by communities and partners in management.

Additionally, continued growth in population is expected in the Chattahoochee basin, especially around the Atlanta metropolitan area and Gainesville (see Section 2). This growth will place additional demands on water resources, and require corresponding responses in management. More people means more water use (drinking water, industrial consumption, irrigation), more stormwater runoff (from impervious surfaces of new houses, roads, industries, businesses, and parking lots), and more contamination (sediment; nutrients; organic material; pesticides, herbicides, and other toxics). Therefore it is essential that stakeholders continue to work together to plan and implement the most cost-effective ways of restoring and protecting water resources.

Basin Management Must Blend Regulatory and Voluntary Approaches

Although the regulatory authorities of agencies such as EPD are very important to protection and restoration of Georgia's waters, RBMP partners will continue to emphasize voluntary and cooperative approaches to watershed management. This will take time and be very challenging. Ultimate success in protecting natural resources for the people of Georgia, however, is dependent on those very same people. Long-term protection means that the people, governments, and businesses must learn collectively what is needed for protection and adapt their lifestyles and operations accordingly. Our experience indicates that we are much more likely to buy into proposed management solutions in which we have a say and control over how we spend our time and money. The challenge in the future, therefore, is to continue to "build bridges" between regulatory and voluntary efforts, using each where they best serve the people and natural resources of Georgia.

8.2 Working to Strengthen Planning and Implementation Capabilities

We Need to Understand One Another's Roles

Increasing awareness and understanding of the roles and capabilities of local, state, and federal partners is one of the keys to future success in basin management for the Chattahoochee River. Lack of understanding can lead to finger pointing and frustration on the part of all involved. Increasing opportunities for stakeholders to develop this awareness and understanding should result in more effective management actions.

This basin plan provides one opportunity for stakeholders to increase their awareness of conditions in the basin, and of ongoing and proposed new management strategies. Within this context, stakeholders can develop a better understanding of certain roles and responsibilities. For example, this basin plan points out several areas where EPD has regulatory authority and corresponding duties including:

- Establishing water quality use classifications and standards
- Assessing and reporting on water quality conditions
- Facilitating development of River Basin Management Plans
- Issuing permits for point source discharges of treated wastewater, municipal stormwater discharges as required, and land application systems
- Issuing water supply permits
- Enforcing compliance with permit conditions

There are many areas, however, where organizations or entities other than EPD are responsible. For example,

- Septic tank permitting (County Health Departments) and maintenance (individual landowners)
- Land development and zoning ordinances (counties, municipalities)
- Sanitary sewer and stormwater ordinances (counties, municipalities)
- Water supply source water protection ordinances (counties, municipalities)
- Flood plain management (FEMA, counties, municipalities)
- Implementation of forestry best management practices (landowners with support from the Georgia Forestry Commission)
- Implementation of agricultural best management practices (landowners with support from state and federal agricultural agencies)
- Proper use, handling, storage, and disposal of chemicals (businesses, landowners, municipalities, counties, etc.)

These are but a few of the areas involved, but they serve to illustrate how responsibilities are spread across many stakeholders in each basin. Additionally, there are other agencies and organizations that assist planning and implementation in many of these areas, i.e., regional development centers; federal, state, and local technical assistance programs; citizens groups; and business associations. As stakeholders become more familiar with one another's responsibilities and capabilities, they will more frequently be aware of appropriate partners to work with in addressing their issues of concern.

Let's Use the RBMP Framework to Improve Communication

Raising awareness frequently involves two way communication. The RBMP framework's interactive planning and outreach sessions provide additional opportunities that support two-way communication. For example, Basin Technical Planning Team meetings provide opportunities for partners to share information on their responsibilities and capabilities with one another. Similarly, River Basin Advisory Committee meetings and Stakeholder meetings provide opportunities for citizens, businesses, government agencies, associations, etc. to share information and learn from one another. Although often requiring considerable time, these interactions are critical to the future of management in the basin because they build working relationships and trust that are essential to carrying out effective, integrated actions.

We Can Also Continue to Streamline Our Efforts

Increased coordination will also result if partners in this approach continue to streamline their efforts. There are many laws and requirements with related and complementary goals, e.g., Georgia's Growth Strategies Act, Planning Act, River Corridor Protection Act, Comprehensive Ground Water Management Plan, and River Basin Management Planning requirements, in addition to federal Clean Water Act water quality regulations and Safe Drinking Water Act source water protection requirements. Partners should continue to find ways to make actions under these laws consistent and complementary by eliminating redundancy and leveraging efforts. Again, partners can use the forums within the RBMP framework (e.g., river basin team and advisory committees) to discuss and implement ideas to streamline roles and make the best use of their funds and staff resources.

8.3 Addressing the Impacts from Continued Population Growth and Land Development

Basin Planning Can Support More Consistent Implementation of Protection Measures

In addressing the impacts from anticipated population growth and increased land development in the basin, future management will need to build off increased understanding of roles and use improved forums for coordination to develop more specific action plans. Historically, mitigating impacts from newly developed areas has been approached mostly on a case-by-case basis. Unfortunately, this has resulted in inconsistent planning and implementation of water resource protection measures. River basin planning offers an opportunity for a more consistent approach by making it easier for landowners, local governments, and businesses to work together at the watershed and basin level.

One way that Georgia EPD will address this issue is by only approving permits for new and expanding permits for water withdrawals and wastewater discharges that are consistent with the basin plan and that meet the intent of the Georgia Planning Act. Rather than waiting until the permit application process, however, local governments can work together and with EPD to work out some of these issues in advance. There is incentive for organizations such as the Georgia Water Pollution Control Association (WPCA), the Georgia Municipal Association (GMA), the Association of County Commissioners of Georgia (ACCG), and Regional Development Centers (RDCs) to work out consistent methods for watershed assessments of developing areas and for improving implementation of protection measures as development occurs. EPD, DCA and other partners can help build these planning bridges by facilitating discussion at RBMP meetings and supporting local initiatives aimed at this issue.

We Need to Work Closely with the ACF Interstate Commission

Another future challenge is securing sufficient allocation of water from the ACF Interstate Commission to maintain needed water supplies for municipal, agricultural, and other purposes in the face of increasing growth and land development pressure. During the remainder of 1997 and 1998, the States of Alabama, Florida, and Georgia, together with the Corps of Engineers, will complete the ACT/ACF data base and modeling effort to analyze alternative options for management of water quantity. The Interstate Commission will be responsible for developing a water allocation formula by the end of 1998. The affected states and their citizens will need to work together to critique, improve, approve and implement the allocations.

8.4 Entering the Next Iteration of the Basin Cycle

Build on the Foundation of Previous, Ongoing, and Planned Efforts

As discussed above and in Section 7.2, there is more work to do to adequately restore and protect all of Georgia's water resources. Following a brief period for focusing on implementation of this plan, the Chattahoochee River Basin will enter into its second iteration of the basin management cycle (scheduled for April, 1999). The next cycle will provide opportunity to review issues that were not fully addressed during the first cycle and to reassess for identification of any new priority issues. In other words, future management efforts can and should build on the foundation created by previous, ongoing, and already planned management actions.

This Basin Plan Provides Historical Reference for the Next Basin Plan

Partners will not have to start from scratch during the next iteration. The information in this document provides an historical account of what is known and planned to date. Stakeholders in the Chattahoochee Basin will know what was accomplished in the first iteration, and can therefore focus on enhancing ongoing efforts or filling gaps. Data collection and public discussion activities scheduled early in the next cycle can draw on information in the plan to identify areas in need of additional monitoring, assessment, and strategy development.

Appendix A

River Basin Planning Act

(O.C.G.A. 12-5-520 to 525)

92 SB637/AP

Senate Bill 637

By: Senators Johnson of the 47th, Pollard of the 24th, Edge of the 28th and Egan of the 40th.

An Act

To amend Chapter 5 of Title 12 of the Official Code of Georgia Annotated, relating to water resources, so as to define certain terms; to provide for the development of river basin management plans for certain rivers; to provide for the contents of such plans; to provide for the appointment and duties of local advisory committees; to provide for notice and public hearings; to provide for submission to and approval of plans to the Board of Natural Resources; to make certain provisions relative to issuing certain permits; to provide for the application for and use of certain funds; to provide that this Act shall not enlarge the powers of the Department of Natural Resources; to repeal conflicting laws; and for other purposes.

Be It Enacted by the General Assembly of Georgia:

Section 1. Chapter 5 of Title 12 of the Official Code of Georgia Annotated, relating to water resources, is amended by inserting at the end thereof the following:

Article 8

12-5-520. As used in this article, the term:

(1) "Board" means the Board of Natural Resources.

(2) "Director" means the director of the Environmental Protection Division of the Department of Natural Resources.

12-5-521. The director shall develop river basin management plans for the following rivers: Alapaha, Altamaha, Canoochee, Chattahoochee, Coosa, Flint, Ochlocknee, Ocmulgee, Oconee, Ogeechee, St. Marys, Satilla, Savannah, Suwanee, Tallapoosa, and Tennessee. The director shall consult the chairmen of the local advisory committees on all aspects of developing the management plans. The director shall begin development of the management plan for the Chattahoochee and Flint river basins by December 31, 1992, and for the Coosa and Oconee river basins by December 31, 1993. Beginning in 1994, the director shall begin development of one management plan per calendar year until all required management plans have been begun. All management plans shall be completed not later than five years after they were begun and shall be made available to the public within 180 days after completion.

12-5-522. The management plans provided by Code Section 12-5-521 shall include, but not be limited to, the following:

(1) A description of the watershed, including the geographic boundaries, historical, current, and projected uses, hydrology, and a description of water quality, including the current water quality conditions;

(2) An identification of all governmental units that have jurisdiction over the watershed and its drainage basin;

(3) An inventory of land uses within the drainage basin and important tributaries including point and nonpoint sources of pollution;

(4) A description of the goals of the management plan, which may include educating the general public on matters involving the environmental and ecological concerns specific to the river basin, improving water quality and reducing pollution at the source, improving aquatic habitat and reestablishing native species of fish, restoring and protecting wildlife habitat, and providing recreational benefits; and

(5) A description of the strategies and measures necessary to accomplish the goals of the management plan.

12-5-523. As an initial action in the development of a management plan, the director shall appoint local advisory committees for each river basin to consist of at least seven citizens and a chairman appointed by the director. The local advisory committees shall provide advice and counsel to the director during the development of the management plan. Each committee shall meet at the call of the chairman but not less than once every four months. The chairman and members of the local advisory committees shall serve without compensation or reimbursement of expenses.

12-5-524.

(a) Upon completion of the penultimate draft of a management plan, the director shall conduct public hearings within the river basin. At least one public hearing shall be held in each river basin named in Code Section 12-5-521. The director shall publish notice of each such public hearing in a newspaper of general circulation in the area announcing the date, time, place, and purpose of the public hearing. A draft of the management plan shall be made available to the public at least 30 days prior to the public hearing. The director shall receive public comment at the public hearing and for a period of at least ten days after the public hearing.

(b) The division shall evaluate the comments received as a result of the public hearings and shall develop the final draft of the management plan for submission to the board for consideration within 60 days of the public hearing.

(c) The board shall consider the management plan within 60 days after submission by the director. The department shall publish the management plan adopted by the board and shall make copies available to all interested local governmental officials and citizens within the river basin covered by such management plan.

(d) Upon the board's adoption of a final river basin management plan, all permitting and other activities conducted by or under the control of the Department of Natural Resources shall be consistent with such plan.

(e) No provision of this article shall constitute an enlargement of the existing statutory powers of the department.

12-5-525. The director is directed to apply for the maximum amount of available funds pursuant to Sections 106, 314, 319, and 104(b)(2) of Public Law 95-217, the federal Clean Water Act, and any other available source for the development of river basin management plans."

Section 2. All laws and parts of laws in conflict with this Act are repealed.

Appendix B

Georgia Instream Water Quality Standards For All Waters: Toxic Substances

(Excerpt From Georgia Rules and Regulations for Water Quality Control Chapter 391-3-6-.03 Water Use Classifications and Water Quality Standards)

I Instream concentrations of the following chemical constituents which are considered to be other toxic pollutants of concern in the State of Georgia shall not exceed the criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones:

1. 2,4-Dichlorophenoxyacetic acid (2,4-D) 70 µg/l
2. Methoxychlor* 0.03 µg/l
3. 2,4,5-Trichlorophenoxy propionic acid (TP Silvex) 50 µg/l

II Instream concentrations of the following chemical constituents listed by the U.S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones or in accordance with site specific effluent limitations developed in accordance with procedures presented in 391-3-6-.06.

1. Arsenic
   (a) Freshwater 50 µg/l
   (b) Coastal and Marine Estuarine Waters 36 µg/l
2. Cadmium
   (a) Freshwater
      (at hardness levels less than 100 mg/l) 0.7 µg/l*
      (at hardness levels of 100 mg/l to 199 mg/l) 1.1 µg/l*
      (at hardness levels greater than or equal to 200 mg/l) 2.0 µg/l*
   Note: Total hardness expressed as $CaCO_3$.
   (b) Coastal and Marine Waters 9.3 µg/l
3. Chlordane*
   (a) Freshwater 0.0043 µg/l
   (b) Coastal and Marine Estuarine Waters 0.004 µg/l
4. Chromium (VI)
   (a) Freshwater 11 µg/l
   (b) Coastal and Marine Estuarine Waters 50 µg/l
5. Total Chromium
   (at hardness levels less than 100 mg/l) 120 µg/l
   (at hardness levels of 100 mg/l to 199 mg/l) 210 µg/l
   (at hardness levels greater than or equal to 200 mg/l) 370 µg/l
   Note: Total hardness expressed as $CaC0_3$.
6. Copper
   (a) Freshwater
      (at hardness levels less than 100 mg/l) 6.5 µg/l*
      (at hardness levels of 100 mg/l to 199 mg/l) 12 µg/l
      (at hardness levels greater than or equal to 200 mg/l) 21 µg/l
      Note: Total hardness expressed as $CaCO_3$.
   (b) Coastal and Marine Estuarine Waters 2.9 µg/l*
7. Cyanide*
   (a) Freshwater 5.2 µg/l
   (b) Coastal and Marine Estuarine Waters 1.0 µg/l
8. Dieldrin* 0.0019 µg/l
9. 4,4'-DDT* 0.001 µg/l
10. a-Endosulfan*
   (a) Freshwater 0.056 µg/l
   (b) Coastal and Marine Estuarine Waters 0.0087 µg/l
11. b-Endosulfan*
   (a) Freshwater 0.056 µg/l
   (b) Coastal and Marine Estuarine Waters 0.0087 µg/l
12. Endrin* 0.002 µg/l
13. Heptachlor*
   (a) Freshwater 0.0038 µg/l
   (b) Coastal and Marine Estuarine Waters 0.0036 µg/l

14. Heptachlor Epoxide*
    (a) Freshwater 0.0038 µg/l
    (b) Coastal and Marine Estuarine Waters 0.0036 µg/l
15. Lead*
    (a) Freshwater
        (at hardness levels less than 100 mg/l) 1.3 µg/l
        (at hardness levels of 100 mg/l to 199 mg/l) 3.2 µg/l
        (at hardness levels greater than or equal to 200 mg/l) 7.7 µg/l
        Note: Total hardness expressed as $CaCO_3$.
    (b) Coastal and Marine Estuarine Waters 5.6 µg/l
16. Lindane [Hexachlorocyclohexane (g-BHC-Gamma)] 0.08 µg/l
17. Mercury*
    (a) Freshwater 0.012 µg/l
    (b) Coastal and Marine Estuarine Waters 0.025 µg/l
18. Nickel
    (a) Freshwater
        (at hardness levels less than 100 mg/l) 88 µg/l
        (at hardness levels of 100 mg/l to 199 mg/l) 160 µg/l
        (at hardness levels greater than or equal to 200 mg/) 280 µg/l
        Note: Total hardness expressed as $CaCO_3$.
    (b) Coastal and Marine Estuarine Waters 8.3 µg/l
19. Pentachlorophenol*
    (a) Freshwater 2.1 µg/l
    (b) Coastal and Marine Estuarine Waters 7.9 µg/l
20. PCB-1016 0.014 µg/l
21. PCB-1221 0.014 µg/l
22. PCB-1232 0.014 µg/l
23. PCB-1242 0.014 µg/l
24. PCB-1248 0.014 µg/l
25. PCB-1254 0.014 µg/l
26. PCB-1260 0.014 µg/l
27. Phenol 300 µg/l
28. Selenium
    (a) Freshwater 5.0 µg/l
    (b) Coastal and Marine Estuarine Waters 71 µg/l
29. Silver **
30. Toxaphene 0.0002 µg/l
31. Zinc
    (a) Freshwater
        (at hardness levels less than 100 mg/l) 60 µg/l
        (at hardness levels of 100 mg/l to 199 mg/l) 110 µg/l
        (at hardness levels greater than or equal to 200 mg/l) 190 µg/l
        Note: Total hardness expressed as $CaCO_3$.
    (b) Coastal and Marine Estuarine Waters 86 µg/l

Notes:

- • The in-stream criterion is lower than the EPD laboratory detection limits.
- ** Numeric limits are not specified. This pollutant is addressed in 391-3-6-.06.

III Instream concentrations of the following chemical constituents listed by the U. S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under annual average or higher stream flow conditions:

1. Acenaphthene **
2. Acenaphthylene **
3. Acrolein 780 µg/l
4. Acrylonitrile 0.665 µg/l
5. Aldrin 0.000136 µg/l
6. Anthracene 110000 µg/l
7. Antimony 4308 µg/l
8. Arsenic 0.14 µg/l
9. Benzidine 0.000535 µg/l
10. Benzo(a)Anthracene 0.0311 µg/l
11. Benzo(a)Pyrene 0.0311 µg/l
12. 3,4-Benzofluoranthene 0.0311 µg/l
13. Benzene 71.28 µg/l
14. Benzo(ghi)Perylene **
15. Benzo(k)Fluoranthene 0.0311 µg/l
16. Beryllium **
17. a-BHC-Alpha 0.0131 µg/l
18. b-BHC-Beta 0.046 µg/l
19. Bis(2-Chloroethyl)Ether 1.42 µg/l
20. Bis(2-Chloroisopropyl)Ether 170000 µg/l
21. Bis(2-Ethylhexyl)Phthalate 5.92 µg/l
22. Bromoform (Tribromomethane) 360 µg/l
23. Carbon Tetrachloride 4.42 µg/l
24. Chlorobenzene 21000 µg/l
25. Chlorodibromomethane 34 µg/l
26. 2-Chloroethylvinyl Ether **

27.	Chlordane	0.000588 µg/l
28.	Chloroform (Trichloromethane)	470.8 µg/l
29.	2-Chlorophenol	**
30.	Chrysene	0.0311 µg/l
31.	Dibenzo(a,h)Anthracene	0.0311 µg/l
32.	Dichlorobromomethane	22 µg/l
33.	1,2-Dichloroethane	98.6 µg/l
34.	1,1-Dichloroethylene	3.2 µg/l
35.	1,3-Dichloropropylene (Cis)	1700 µg/l
36.	1,3-Dichloropropylene (Trans)	1700 µg/l
37.	2,4-Dichlorophenol	790 µg/l
38.	1,2-Dichlorobenzene	17000 µg/l
39.	1,3-Dichlorobenzene	2600 µg/l
40.	1,4-Dichlorobenzene	2600 µg/l
41.	3,3'-Dichlorobenzidine	0.077 µg/l
42.	4,4'-DDT	0.00059 µg/l
43.	4,4'-DDD	0.00084 µg/l
44.	4,4'-DDE	0.00059 µg/l
45.	Dieldrin	0.000144 µg/l
46.	Diethyl Phthalate	120000 µg/l
47.	Dimethyl Phthalate	2900000 µg/l
48.	2,4-Dimethylphenol	**
49.	2,4-Dinitrophenol	14264 µg/l
50.	Di-n-Butyl Phthalate	12100 µg/l
51.	2,4-Dinitrotoluene	9.1 µg/l
52.	1,2-Diphenylhydrazine	0.54 µg/l
53.	Endrin Aldehyde	0.81 µg/l
54.	Endosulfan Sulfate	2.0 µg/l
55.	Ethylbenzene	28718 µg/l
56.	Fluoranthene	370 µg/l
57.	Fluorene	14000 µg/l
58.	Heptachlor	0.000214 µg/l
59.	Heptachlor Epoxide	0.00011 µg/l
60.	Hexachlorobenzene	0.00077 µg/l
61.	Hexachlorobutadiene	49.7 µg/l
62.	Hexachlorocyclopentadiene	17000 µg/l
63.	Hexachloroethane	8.85 µg/l
64.	Indeno(1,2,3-cd)Pyrene	0.0311 µg/l
65.	Isophorone	600 µg/l
66.	Lindane [Hexachlorocyclohexane (g-BHC-Gamma)]	0.0625 µg/l
67.	Methyl Bromide (Bromomethane)	4000 µg/l
68.	Methyl Chloride (Chloromethane)	**
69.	Methylene Chloride	†
70.	2-Methyl-4,6-Dinitrophenol	765 µg/l
71.	3-Methyl-4-Chlorophenol	**
72.	Nitrobenzene	1900 µg/l
73.	N-Nitrosodimethylamine	8.12 µg/l
74.	N-Nitrosodi-n-Propylamine	**
75.	N-Nitrosodiphenylamine	16.2 µg/l
76.	PCB-1016	0.00045 µg/l
77.	PCB-1221	0.00045 µg/l
78.	PCB-1232	0.00045 µg/l
79.	PCB-1242	0.00045 µg/l
80.	PCB-1248	0.00045 µg/l
81.	PCB-1254	0.00045 µg/l
82.	PCB-1260	0.00045 µg/l
83.	Phenanthrene	**
84.	Phenol	4,600,000 µg/l
84.	Pyrene	11,000 µg/l
85.	1,1,2,2-Tetrachloroethane	10.8 µg/l
85.	Tetrachloroethylene	8.85 µg/l
87.	Thallium	48 (6.3) µg/l ‡
88.	Toluene	200000 µg/l
89.	1,2-Trans-Dichloroethylene	**
90.	1,1,2-Trichloroethane	41.99 µg/l
91.	Trichloroethylene	80.7 µg/l
92.	2,4,6-Trichlorophenol	6.5 µg/l
93.	1,2,4-Trichlorobenzene	**
94.	Vinyl Chloride	525 µg/l

Notes:

** Numeric limits are not specified. These pollutants are addressed in 391-3-6-.06.

† EPD has proposed to the Board of Natural Resources changing numeric limits for methylene chloride from unspecified to 1600 µg/l consistent with EPA's National Toxics Rule.

‡ EPD has proposed to the Board of Natural Resources changing numeric limits for thallium from 48 to 6.3 µg/l consistent with EPA's National Toxics Rule.

IV Site specific criteria for the following chemical constituents will be developed on an as-needed basis through toxic pollutant monitoring efforts at new or existing discharges that are suspected to be a source of the pollutant at levels sufficient to interfere with designated uses:

1. Asbestos

V Instream concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) must not exceed 0.0000012 µg/l under long-term average stream flow conditions.

(e) Applicable State and Federal requirements and regulations for the discharge of radioactive substances shall be met at all times.

Appendix C

Point Source Control Efforts

Georgia DNR's management has promoted continuing improvement in the quality of return flows from permitted point sources in the basin. During the past twenty-five years, the majority of our municipal wastewater treatment plants were constructed or updated to meet state and/or federally mandated effluent standards. State and federal construction grants and the citizens of local municipalities funded these projects. This massive construction program has been so successful that over 90% of all these facilities in Georgia are currently meeting their effluent limits. We must protect our investments in these facilities and in the State's water quality.

The history of construction improvements for permitted dischargers within the Chattahoochee basin is summarized in the following table:

HUC 03130001

1949 American Proteins, Inc. land application system.

1955 Tyson Foods in Cumming, built 7 acre faculative lagoon for $35,000.

1956 City of Gainesville Linwood Drive WPCP,3.1 MGD trickling filter sytem, $693,578.

1960 Tallulah Falls School WTF, $14,000.

1960 City of Gaineville WPC#1 (Flat Creek) 1.5 MGD trickling filter system, $1,000,000.

1965 Gainesville WPC#1 converted to activated sludge system, $1,337,886

1965 Cobb County Rottenwood WPCP, activated sludge system, 0.5 MGD, $500,000.

1966 Dixie Mobile Home Park 0.0053 MGD oxidation pond for $1,800.

1966 Clarkesville Trickling Filter System, 0.750 MGD, $500,000.

1966 Mount Vernon Mills, Inc. Alto Fabric Plant WTF.

1967 Shady Gove Mobile Home Park 0.020 MGD oxidation pond.

1968 Tyson upgraded, $40,000.

1969 Gainesville upgraded Linwood Drive and WPC#1, $451,443.

1969 Fulton County Big Creek WPCP, 0.75 MGD, $1,000,000.

1971 Tyson upgraded, $135,000.

1971 Lanier-Habersham Utility Corp. WTF.

1971 North Hall High School, 0.03 MGD.

1971 East Hall High School, 0.028 MGD.

1972 Gwinnett County Crooked Creek, 1.0 MGD two package plants, $1,000,000.

1972 Johnson High School, 0.04 MGD.

1972 Wrigley Co. WTF, $164,000.

1972 Gwinnett County Crooked Creek, 1.0 MGD with two package plants, $1,000,000.

1973 Cobb County Chattahoochee River WPCP, activated sludge, 10.0 MGD, $5,000,000.

1973 Fulton County Big Creek expanded to 1.6 MGD.

1973 Habersham Mills, $34,320.

1973 Cinnamon Cove Condominium Association WTF.

1973 Mountain Lakes Resort, Inc., subsurface sand filter, 0.009 MGD.

1975 White Sulfur School, 0.013 MGD.

1975 Fulton County Big Creek WPCP expanded to 6.0 MGD.

1976 Tyson upgraded, $270,000.

1976 DNR Buford Trout Hatchery WTF.

1976 Habersham Mills upgraded, $24,975.

1976 Buford Westside WTF, 0.25 MGD, $204,844.

1976 Buford Southside WTF, 1.0 MGD, $554,854.

1977 Flowery Branch WTF, 0.2 MGD activated sludge system, $270,000.

1977 Gwinnett County Crooked Creek upgraded and expanded to 2 MGD, $1,300,000.

1979 Gainesville WPC#1 upgarded, $7,510,522.

1980 Cobb County Chattahoochee River WPCP upgraded and expanded to 20.0 MGD, $20,000,000.

1980 American Proteins, Inc. land application system, $70,000.

1980 Fulton County John's Creek WPCP, 5 MGD.

1982 Fulton County Big Creek WPCP expanded to 8.0 MGD.

1983 Tyson upgraded, $200,000.

1983 Dutch Quality House, 0.04 MGD land application system, $160,000.

1983 Cobb County Chattahoochee River WPCP expanded to 26.5 MGD, $1,300,000.

1984 Ranch Owner's Association, Inc., 0.1 MGD land application system, $250,000.

1985 Chattahoochee Country Club, 0.1 MGD, $71,000.

1985 Mount Vernon Mills Alto Fabric Plant WTF upgraded $8,876.

1985 American Proteins, Inc. upgardes, $32,000.

1985 Helen Land Application System, $1,139,000.

1985 Tyson upgrades, $150,000.

1986 American Proteins, Inc. Expanded land application system, $635,000.

1986 Tyson upgraded, $175,000.

1986 Wrigley Co. WTF upgraded, $83,674.

1986 Fulton County Big Creek WPCP expanded to 9.0 MGD.

1987 Fulton County Big Creek WPCP upgraded and expanded to 11.0 MGD, $2,123,416.

1987 Gainesville added emergency generators to Linwood Drive WPCP and WPC#1, $200,000.

1987 Gwinnett County Crooked Creek upgraded and expanded to 6.5 MGD, $16,000,000.

1987 Tyson constructed new facility, 2.5 MGD, $2,200,000.

1988 American Proteins, Inc. upgraded, $60,000.

1989 Gainesville WPC#1 Upgraded, $15,000.

1989 Scovill Fasteners, Inc., 0.27 MGD, $1,500,000.

1990 Buford Southside WTF expanded to 2.0 MGD, $2,701,092.

1990 Cobb County Chattahoochee River WPCP, now known as R. L. Sutton Water Reclamation Facility, upgraded and expanded to 40 MGD, $50,000,000.

1991 Dutch Quality House new dissloved air floatation unit and connection to the City of Gainesville sewer system, $300,000.

1991 Mount Vernon Mills Alto Fabric Plant WTF upgraded, $342,162.

1992 Fulton County Big Creek WPCP upgraded and expanded to 24 MGD, $48,000,000.

1992 Fulton County John's Creek WPCP expanded to 7 MGD, $5,533,210.

1992 Gwinnett County Crooked Creek expanded to 16 MGD, $17,000,000.

1992 City of Cumming, 2 MGD activated sludge, $4,000,000.

1992 Wrigley Co. WTF upgraded, $125,000.

1992 American Proteins, Inc. upgraded, $300,000.

1993 American Proteins, Inc. upgraded, $500,000.

1993 City of Cleveland, 0.75 MGD, $2,320,000.

1993 Tyson replaced aeration system, $400,000.

1994 Sugar Hill Land Application System, 0.50 MGD, $9,250,000.

1994 American Proteins, Inc. upgrades, $558,000.

1995 American Proteins, Inc. upgrades, $70,000.

1995 Gainesville WPC#1 upgraded, $16,200,000.

1995 Gwinnett County Crooked Creek odor control system added, $7,000,000.

1995 Mount Vernon Mills Alto Fabric Plant WTF upgrade $225,034.

1995 Lanier-Habersham Utility Corp. WTF upgraded, $3,000.

1996 Tyson equipment replacement, $62,000.

1996 Helen Land Application System upgraded, $263,000.

1997 American Proteins, Inc. upgrades, $1,050,000.

1997 Gwinnett County Crooked Creek added new centrifuge, $1,500,000.

1997 City of Dahlonega upgraded and expanded from 0.72 MGD to 1.44 MGD, $3,886,000.

HUC 03130002

1914 Atlanta Proctor Creek WTF trickling filter.

1914 Atlanta Peachtree Creek WTF trickling filter.

1937 Atlanta Utoy Creek primary treatment plant.

1938 Atlanta R.M. Clayton WPCP, 42 MGD primary treatment.

1938 LaGrange Hogansville Road WPCP, 0.125 MGD.

1942 Lockheed-Georgia Co. WTF.

1950 Georgia Power Plant Yates, activated sludge system, 0.014 MGD.

1951 Pine Mountain Imhoff tank installed.

1952 Bibb Manufacturing Company's Arnall WPCP.

1952 LaGrange Blue John Municipal 3.5 MGD.

1960 Fulton County Camp Creek WPCP, 3 MGD, $1,000,000.

1962 Newnan, Snake Creek WPCP, 0.4 MGD trickling filter, $247,000.

1963 Bibb Manufacturing Company's Arnco WPC.

1965 Cobb County Rottenwood WPCP, 0.5 MGD,$500,000.

1967 LaGrange Blue John Industrial, 2.5 MGD.

1967 LaGrange Yellow Jacket WPCP, 1.0 MGD

1969 Palmetto WTF, 0.60 MGD.

1969 Union City WPCP, 0.25 MGD, $175,000.

1970 Newnan, Mineral Springs WPCP, 0.75 MGD activated sludge.

1971 Pine Mountain 0.125 MGD activated sludge, $187,000.

1971 F. D. Roosevelt State Park, WTF, 0.006 MGD.

1972 Lockheed-Georgia Co. WTF, 3.5 MGD, $2,960,000.

1972 Douglas County School System, Bill Arp Elementary School

1973 Douglasville Southside WWTP, 1.0 MGD.

1973 Cobb County Chattahoochee WPCP(now known as the R.L.Sutton Water Reclamation Facility), 10 MGD, $5,000,000.

1973 Days Inn LaGrange, 0.020 MGD land application system.

1973 Douglas Rebel Trails WWTP, 0.04 MGD, $45,000.

1973 DOT I-95 South Rest Area, 0.015 MGD.

1973 DOT I-95 North Rest Area 0.030 MGD.

1974 Lockheed-Georgia Co. WTF upgraded and expanded to 7.0 MGD, $4,180,000.

1975 Milliken's Duncan M. Stewart WTF, $93,718.

1975 Atlanta Utoy Creek WPCP upgraded and expanded to 30 MGD.

1976 Atlanta R.M. Clayton upgraded and expanded to 120 MGD.

1976 Georgia Power Plant Wansley, activated sludge system, 0.01 MGD.

1976 Newnan Wahoo Creek WPCP, 0.750 MGD activated sludge, $950,000.

1976 Douglasville Beaver Estates WWTP, $70,000.

1976 Union City WPCP added disinfection, $92,000.

1977 Douglasville Northside WWTP, 1.0 MGD, $709,900.

1977 Harris County High School, 0.016 MGD.

1980 Cobb Co. Chattahoochee WPCP upgraded and expanded to 20 mgd, $20,000,000.

1982 LaGrange Blue John Industrial upgrades, $1,000,000.

1982 Coweta County took ownership of the Bibb Manufacturing Company Arnall and WPCPs.

1983 Cobb Co. Chattahoochee WPCP expanded to 26.5 MGD, $1,300,000.

1984 City of Hamilton, 0.045 MGD, activated sludge system.

1984 DOT I-85 South Rest Area 0.015 upgraded, $8,000.

1984 DOT I-85 North Rest Area 0.030 upgraded, $8,000.

1985 Douglasville St. Andrews land application system, $290,000.

1985 Franklin Aluminum industrial WTF, $218,621.

1986 LaGrange Long Cane Creek WPCP, 8.2 MGD, $22,000,000.

1986 LaGrange. Hogansville Road, Yellow Jacket, Blue John Municipal & Industrial facilities taken out of service. Flows routed to Long Cane Creek WPCP.

1987 Douglasville Southside expanded to 1.5 MGD.

1989 Douglasville Sweetwater Creek, 3.0 MGD, $6,100,000.

1989 Fulton County Camp Creek WPCP upgraded for 13 MGD, $256,400.

1990 Douglasville Southside WWTP upgraded, 3.25 MGD, $6,000,000.

1990 Cobb Co. R.L. Sutton Water Reclamation Facility upgraded and expanded to 40 MGD, $50,000,000.

1991 Coweta County Arnall WPCP upgraded

1993 Newnan Wahoo, upgraded and expanded to 3.00 MGD, $5.2 million

1993 LaGrange Long Cane Creek upgrade, $5,600.000.

1994 Coweta County Arnco WPCP upgraded.

1994 Newnan Wahoo, new lab, $175,000.

1994 LaGrange Long Cane Creek expanded to 12.5 MGD, $21,400,000.

1994 Atlanta North Ave., Greensferry, and Tanyard CSO Facilities, $45,000,000.

1996 Days Inn LaGrange rehabilitated 0.030 land application system, $60,000.

1996 City of Hamilton, added improvements to lab.

HUC 0313003

1964 US Army Fort Benning, facility #1, primary treatment, $1,012,565

1964 US Army Fort Benning, facility #2, primary treatment, $183,376

1967 US Army Fort Benning, facility #1, expanded and upgrades, $4.6 MGD.

1967 US Army Fort Benning, facility #2, expanded and upgrades, 3.8 MGD.

1974 DNR Florence Marina State Park Treatment Plant, $42,520.

1979 US Army Fort Benning, facility #3 closed and flows routed to facility #1.

1989 Chattahoochee County 0.022 MGD land application system, $171,726.

1995 Columbus CSO Facilities, $82,000,000.

HUC 0313004

1975 Fort Gaines WPCP, 0.15 MGD, $209,000.

1987 Georgia Tubing Corp. WPCP, $900,000.

1996 Fort Gaines WPCP, upgraded, $280,000.

Appendix D

NPDES Permits (Georgia and Alabama) for Discharges in the Chattahoochee River Basin

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
HUC 03130001					
Atlanta CSO	GA0036871			Clear Creek	03130001
Atlanta CSO	GA0037109			Tanyard Branch	03130001
Chattahoochee MHP	GA0050041			Strickland Springs	03130001
Camp Barney Medintz	GA0034983	0.040		Jenny Cr	03130001
Baker & Glover MHP	GA0027049			Little Rv	03130001
Baldwin WPCP	GA0033243	0.300		Little Mud Cr	03130001
Blue Circle Williams Bros	GA0048640			Unnamed Trib/to Chattahoochee Rv	03130001
Blue Circle Williams	GA0001627			Unnamed Trib. To Chattahoochee Rv.	03130001
Blue Circle Inc Forsyth	GA0046850			Daves Crk	03130001
Blue Circle Williams	GA0046906			Unnamed Trib to North Fork/Peachtree	03130001
Buford Westside WPCP	GA0023175	0.250		Richland Cr	03130001
Buford Southside	GA0023167	2.000	Y	Suwanee Cr	03130001
Camp Coleman Cleveland	GA0035467	0.020		Town Cr	03130001
Camp Glisson	GA0033979	0.000		Unnamed Trib to Cane Cree	03130001
Chattahoochee Country Club	GA0022471	0.010		Lake Lanier	03130001
Chattahoochee Bay	GA0024198			Lake Lanier	03130001
Cinnamon Cove Condominium	GA0049051			Lake Lanier	03130001
Clarkesville WPCP	GA0032514	0.750		Soquee River in Chattahoo	03130001
Cleveland WPCP	GA0036820	0.750		Tesnatee Crk Trib	03130001
Columbus Foundries Inc	GA0047619			Roaring Branch	03130001
Cornelia WPCP	GA0021504	3.000	Y	So Fork-Little Mud Cr	03130001
Countryside MHP	GA0030201	0.125		Suwanee Cr	03130001
Cumming	GA0046019	2.000	Y	Big Cr	03130001
Dahlonega WPCP	GA0026077	0.720		Yahoola Creek Trib	03130001
Davidson Mineral Prop Habersham	GA0046086			Hazel Creek	03130001
Demorest WPCP	GA0032506	0.400		Hazel Creek Trib	03130001
Dixie MHP Gainesville	GA0023043	0.005		Flat Cr	03130001
DOT Rest Area #76/Suwanee	GA0023604	0.015		Ivy Cr	03130001

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
DOT Rest Area #75/Suwanee	GA0023663	0.035		Suwanee Cr	03130001
Flowery Branch Elem School	GA0027090	0.012		Mud Cr	03130001
Flowery Branch WPCP	GA0031933	0.200		Lake Sidney Lanier	03130001
Forsyth Consol School	GA0035971	0.038		Settingdown Cr	03130001
Friendship Health Care	GA0026379	0.020		Stephens Cr	03130001
Fulton Co Big Creek	GA0024333	24.000	Y	Chattahoochee River	03130001
Fulton Co Johns Creek	GA0030686	7.000	Y	Chattahoochee Rv	03130001
Gainesville Flat Cr WPCP	GA0021156	7.000	Y	Flat Cr	03130001
Gainesville Linwood	GA0020168	3.000	Y	Lake Lanier	03130001
Georgia Power Morgan Falls	GA0001511			Chattahoochee Rv	03130001
Gwinnett Co Crooked Cr/North	GA0026433	36.000 16	Y	Crooked Cr	03130001
Habersham on Lanier	GA0030261	0.110		Little Ridge Cr	03130001
Habersham Mills Inc	GA0001694			Soque Rv	03130001
High Point Minerals Inc	GA0037281			Unnamed Trib to Cavenders Crk.	03130001
Lake Lanier Trout Hatchery	GA0026174			Chattahoochee River	03130001
Lake Lanier Islands	GA0049115	0.350		Lake Lanier	03130001
Lake Burton Hatchery	GA0029840			Lake Burton	03130001
Lakeside Mobile Home Comm	GA0049891	0.003		Indian Springs Br	03130001
Lanier Elem School	GA0034843	0.006		Lake Lanier Trib	03130001
Lanier Beach South	GA0031674			Lake Sidney Lanier	03130001
Lee Arrendale Corr Inst	GA0022209	0.250		Trib to Mountain Cr	03130001
Long Branch Quarry	GA0037508			Unnamed Trib./Long Branch Crk	03130001
Long Mountain Quarry	GA0046302			Unnamed Trib./Shoal Creek	03130001
Lula Pond	GA0024767	0.082		Lula Br Trib to Hagen Cr	03130001
Magnolia Plantation	GA0033928	0.005		Cane Cr Trib	03130001
Martin Marietta Aggegates	GA0047562	0000.000		Dick Creek	03130001
Martin Marietta Corp	GA0037290			Six Mile Creek	03130001
Mountain Lakes Resort	GA0046400	0.009		Cathy Creek	03130001

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
Mount Vernon Mills	GA0002461			Mountain Cr	03130001
North Hall High School	GA0034886	0.030		Wahoo Cr	03130001
Oak Grove MHP	GA0034207	0.005		Cane Cr Trib	03130001
Oakwood Elem School	GA0048089	0.012		Nameless Cr-Balus Cr	03130001
Plantation Pipe Line Doraville	GA0030953			Nancy Cr	03130001
Sardis Elem School	GA0034860	0.009		Lake Lanier Trib	03130001
Sawnee Elem School	GA0035866	0.025		Unnamed Trib to Cheatham	03130001
Scovill Mfg Clarkesville	GA0001112		Y	Soquee River	03130001
Shadygrove MHP Flowery Br	GA0023469	0.020		Unnamed Trib to Balus Cre	03130001
SKF Bearing Industries Co	GA0037265			Mud Creek	03130001
So Hall Industrial Park	GA0034924	0.010		Balus Cr-lake Lanier	03130001
Tyson Foods Inc	GA0001074			Unnamed Trib/Orr's Creek	03130001
Wauka Mt Elem School	GA0032697	0.014		East Fork Little Rv	03130001
White Sulfur Elem School	GA0027120	0.013		Trib to Lake Lanier	03130001
Williams Brothers Conc Co	GA0047601			Unnamed Trib. To Foe Killer Creek	03130001
HUC 03130002					
Acres of Shade MHP	GA0035912	0.002		Stribling Cr	03130002
Ajay Chemicals Inc	GA0048283			Ditch to Noses Creek	03130002
Ala-Ga Wood Preservers	AL0068837			Finley Creek	03130002
Atlanta CSO	GA0037125			Proctor Creek	03130002
Atlanta CSO	GA0037117			Trib. To Proctor Creek	03130002
Atlanta South River	GA0024040	48.000	Y	Chattahoochee via Atlanta Utoy Creek	03130002
Atlanta Utoy Creek	GA0021458	40.000	Y	Chattahoochee	03130002
Atlanta R M Clayton	GA0021482	100.000	Y	Chattahoochee	03130002
Ben-Mor Village Home Estates	AL0062391	0.06		Mores Creek	03130002
Bill Arp Elem School	GA0034622	0.004		Bear Cr-Chattahoochee Rv	03130002
Blue Circle Inc Douglas	GA0030899			Mobley Cr	03130002
Blue Circle Williams	GA0025917			Tributary to Noses Crk.	03130002
Blue Circle Inc Harris	GA0047155			Heiferhorn Crk and Kokoloe Crk	03130002

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
Brian Center Nursing Home	GA0029998	0.019		Unnamed Trib to Blue John	03130002
Brookwood MHP	GA0031526	0.021		Anneewakee Cr	03130002
C.W. Matthews Contracting	GA0048356			Unnamed Trib/Proctor Crk.	03130002
Cagles Inc Harris	GA0001317			Fort Cr	03130002
Callaway Gardens	GA0022527	0.500		Mountain Cr	03130002
Chambers Academy	AL0059731	0.0075		Kellum Hill Creek	03130002
Cobb Co R L Sutton	GA0026140	40.000	Y	Chattahoochee Rv	03130002
Cobb Co South	GA0026158	32.000	Y	Chattahoochee Rv	03130002
Colonial Pipeline	GA0048429			Olley Cr-Sweetwater Cr	03130002
Coweta Co Arnall WPCP	GA0000299	0.060		Wahoo Cr	03130002
Coweta Co Arnco WPCP	GA0000311	0.100		Wahoo Cr	03130002
Days Inn	GA0022632	0.030		Alton Pott's Lake	03130002
DNR Franklin Roosevelt St	GA0049204			Bethlehem Cr	03130002
Douglas Co Rebel Trails W	GA0049786	0.040		Anneewakee Creek Trib	03130002
Douglas Co Beaver Est WPCP	GA0031402	0.080		Crooked Creek Trib	03130002
Douglasville Sweetwater	GA0047201	3.000	Y	Chattahoochee River	03130002
Douglasville South	GA0030341	3.250	Y	Anneewakee Cr	03130002
Douglasville North	GA0030350	0.600		Gothards Cr to Sweetwater	03130002
East Alabama WWTP	AL0024724	4.00	Y	Chattahoochee River	03130002
Evoline C West Elem School	GA0035378	0.009		Bear Cr	03130002
Franklin Aluminum Company	GA0000922		Y	Hillabahatchee Cr	03130002
Franklin	GA0021148	0.160		Chattahoochee R	03130002
Fulton Co Camp Creek	GA0025381	13.000	Y	Chattahoochee River	03130002
Fulton Co Little Bear	GA0047104	0.100		Little Bear Cr	03130002
Georgia Power Bartletts Ferry	GA0001490			Chattahoochee Rv	03130002
Georgia Power Goat Rock	GA0001503			Chattahoochee Rv	03130002
Georgia Power Wansley	GA0026778			Chattahoochee Rv	03130002
Georgia Power Yates	GA0001473		Y	Chattahoochee Rv	03130002

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
Georgia Power McDon/Atkin	GA0001431			Chattahoochee Rv	03130002
Georgia Pacific Company	GA0024813			White Sulfur Cr	03130002
Grantville Pond #1	GA0033197	0.050		New Mountain Cr Trib	03130002
Grantville Pond #4	GA0033227	0.030		Yellow Jacket Cr Trib	03130002
Grantville Pond #2	GA0033201	0.040		New Mountain Cr	03130002
Grantville Pond #3	GA0033219	0.050		Yellow Jacket Cr Trib	03130002
Hamilton WPCP	GA0033618	0.085		Palmetto Cr	03130002
Harris Co High School	GA0049310	0.106		Palmetto Cr	03130002
Heard County Quarry	GA0046612			Spring Br	03130002
Kimberly Clark Corp	GA0046914			Unnamed Drainage Ditch/Blue Johns C	03130002
LaGrange Long Cane WPCP	GA0036951	12.500	Y	Chattahoochee Rv	03130002
Lanett WWTP	AL0023159	5.00	Y	Chattahoochee River	03130002
Milliken Design Center	GA0035688			Tanyard Cr	03130002
Milliken Duncan Stewart Plt	GA0024791			Long Cane Cr	03130002
Milliken & Co Elm City Pt	GA0047406			Blue John Crk	03130002
Milliken Pine Mtn Plant	GA0024651			Polecat Creek	03130002
Moore's MHP	GA0031518	0.006		Blue John Cr	03130002
National Starch & Chemical	GA0003352			Unnamed Ditch to Peachtree Crk.	03130002
Newnan Mineral Springs	GA0021423	0.750		Mineral Springs Trib	03130002
Newnan Wahoo WPCP	GA0031721	2.300	Y	Unnamed Trib to Wahoo Cr	03130002
Newnan Snake Creek	GA0021431	0.400		Snake Cr Trib to Wahoo	03130002
Oakview Home	GA0031208	0.014		Mulberry Cr	03130002
Palmetto WPCP	GA0025542	0.600		Little Bear Cr	03130002
Pine Mountain WPCP	GA0025691	0.125		Turkey Creek Trib	03130002
Pine Lake MHP	GA0035271	0.050		Bear Cr	03130002
Raylar Corp Lagrange	GA0032565	0.030		Long Cane Cr	03130002
Sweetwater Paper Board Austell	GA0035823			Sweetwater Cr	03130002
Union City WPCP	GA0023094	0.250		Deep Creek Trib	03130002
USAF (Lockheed Plt #6)	GA0001198		Y	Nickajack Cr/Rottenwood Cr/Poorhous	03130002

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
Villa Rica Sweetwater	GA0027171	0.520		Town Br Cr/Sweetwater Cr	03130002
Vulcan Mat Villa Rica Quarry	GA0032433			Crawfish Cr	03130002
Vulcan Mat Lagrange	GA0024422			Panther Cr	03130002
Vulcan Mat Barin Quarry	GA0000761			Unnamed Trib/Heiferhorn Crk.	03130002
Vulcan Mat Lithia Springs	GA0000779			Beaver Run Creek	03130002
Vulcan Mat Red Oak	GA0000752			Kimberly Creek	03130002
Wellington Sears Langdale	AL0002933			Chattahoochee River	03130002
West Point WPCP	GA0020052	1.000	Y	Chattahoochee Rv	03130002
Westek Inc	GA0000833			Yellowjacket Cr	03130002
Williams Bros Concrete Co	GA0001643			Fur Cr	03130002
Wm L Bonnell Co Newnan	GA0000507			Mineral Sp Br	03130002
Young Refining Corp	GA0001902			Cracker Cr	03130002
HUC 03130003					
Beulah High School	AL0043664	0.014		UT to Halawakee Creek	03130003
Blessed Trinity Shrine Retreat	AL0059251	0.0225		UT to Chattahoochee River	03130003
Columbia Yeast	AL0057801			Spivey Mill Creek	03130003
Columbus South	GA0020516	42.000	Y	Chattahoochee Rv	03130003
DNR Florence Marina	GA0030147	0.029		Lake Walter F George	03130003
Eufaula WWTP	AL0061671	2.70	Y	Chattahoochee River	03130003
Eufaula Adolescent Center	AL0044563	0.0213		UT to Barbour Creek	03130003
Fieldcrest Mills	GA0001210			Chattahooche Rv	03130003
Florida Rock Ind Muscogee	GA0046477			Heiferhorn Crk	03130003
Georgia Power N Highlands	GA0001538			Chattahoochee Rv	03130003
Georgia Power Oliver Dam	GA0001520			Chattahoochee Rv	03130003
Hurtsboro HCR Lagoon	AL0020699	0.26		Hurtsboro Creek	03130003
LA Pacific-Clayton	AL0068039			UT to Barbour Creek	03130003
Lakepoint Resort	AL0023906	0.15		Chattahoochee River	03130003
Lumpkin WPCP	GA0021032	0.200		Hodchodkee Creek Trib	03130003

Facility Name	NPDES #	Permitted Flow	Major?	Receiving Stream	HUC Unit
Mead Coated Board Inc.	AL0000817		Y	Chattahoochee River	03130003
Phenix City WWTP	AL0022209	7.75	Y	Chattahoochee River	03130003
Russell County High School	AL0057088	0.0325		Groundwater	03130003
Russell Jr. High School	AL0051845	0.036		UT to Tallalliba Creek	03130003
Smiths Station High School	AL0043681	0.054		UT to Mill Creek	03130003
Southern Natural Gas Harris	GA0037541			Unnamed Trib of Randell Crk	03130003
TNS Mills,Inc	AL0063681			UT to Cheneyhatchee Creek	03130003
USA Ft Benning	GA0000973	4.600	Y	Chattahoochee River	03130003
Walker-Williams Lumber Co.	AL0065455			Hatchechubbee Creek	03130003
HUC 03130004					
Abbeville South Lagoon	AL0059358	0.55		Abbie Creek	03130004
Columbia Lagoon	AL0058335	0.18		Chattahoochee River	03130004
Dothan Omussee Creek WWTP	AL0022764	5.00	Y	Omussee Creek	03130004
Fort Gaines WPCP	GA0026191	0.300		Chattahoochee River	03130004
Georgia Pacific Great S.P.	GA0001201		Y	Chattahoochee Rv	03130004
Georgia Tubing Corp	GA0000230			Chattahoochee Rv	03130004
Great Southern Wood	AL0065510			UT to Poor Creek	03130004
Headland South WWTP	AL0027014	0.50		White Branch	03130004
SNC Farley Nuclear Plant	AL0024619		Y	Chattahoochee River	03130004

Appendix E

Support for Designated Uses for Rivers, Streams, and Lakes in the Chattahoochee River Basin, 1994-95

Table E-1. Support of Designated Uses for Rivers and Streams in Hydrologic Unit 03130001 of the Chattahoochee River Basin, 1994–1995 (GA DNR, 1996).

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
RIVERS AND STREAMS SUPPORTING DESIGNATED USES - HUC 03130001										
Bear Creek (10)	Near Clermont	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Boggs Creek (4)	Lumpkin County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Cane Creek (4)	Lumpkin County	Fishing	S	N/A	N/A	N/A	N/A	8	NA	N/A
Cavender Creek (4)	Lumpkin County	Fishing	S	N/A	N/A	N/A	N/A	2	NA	N/A
Chattahoochee River (4)	Upstream Jasus Creek	Fishing	S	N/A	N/A	N/A	N/A	7	NA	N/A
Cry Creek (20)	Gainesville	Fishing	S	N/A	N/A	N/A	N/A	1	NA	N/A
Deep Creek (10)	Habersham County	Fishing	S	N/A	N/A	N/A	N/A	8	NA	N/A
Dick Creek (1)	Forsyth County	Fishing	S	N/A	N/A	N/A	N/A	2	NA	N/A
Dicks Creek (1)	Headwaters to Waters Creek	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Dukes Creek (4)	White County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Haw Creek (1)	Forsyth County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Kitchen Creek (18)	Gwinnett County	Fishing	S	N/A	N/A	N/A	N/A	2	NA	N/A
Kubota Creek (2)	Gainesville	Fishing	S	N/A	N/A	N/A	N/A	1	NA	N/A
Little Panther Creek (4)	Habersham County	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Little Tesnatee Creek (4)	White County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Low Gap Creek (9)	Northwest of Helen	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Sautee Creek (4)	Habersham/ White Counties	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Smith Creek (4)	White County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Soque River (4)	Habersham County	Fishing	S	N/A	N/A	N/A	N/A	29	NA	N/A
South Fork Camp Creek (34)	College Park	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Squirrel Creek (22)	Hall County	Fishing	S	N/A	N/A	N/A	N/A	2	NA	N/A
Tesnatee Creek (4)	Lumpkin/White Counties	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Town Creek (4)	White County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Tuggle Creek (4)	Fulton County	Fishing	S	N/A	N/A	N/A	N/A	3	N/A	N/A
Waters Creek (4)	Lumpkin County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
White Creek (10)	Cleveland/Upstream Webster Lake	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Yahoola Creek (4)	Jack Walker Road to Hwy 52 (Lumpkin Creek)	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
RIVERS AND STREAMS PARTIALLY SUPPORTING DESIGNATED USES - HUC 03130001										
Name	**Location (HUC 03130001)**	**Use Classification**	**Status**	**Criteria Violated**	**Evaluated Causes**	**Actions to Alleviate**	**305(b)**	**Miles**	**303(d) Listing**	**Priority**
Balus Creek (22, 26)	Gainesville	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	X	4
Big Creek (26)	Hall County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
Big Creek (1, 10, 17, 40)	Hwy 400 to Chattahoochee River	Fishing/ Drinking Water	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	5	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Chattahoochee River (1, 9)	Downstream Helen	Recreation	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	8	X	4
Chattahoochee River (1, 9, 18)	Hwy 20 to Hwy 141	Recreation/ Drinking Water	PS	FC,FCG	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	15	2	1
Chattahoochee River (9)	Jasus Creek to Helen	Recreation	PS	Pb*	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	8	X	4
Chattahoochee River (1, 9, 17)	Hwy 141 to U.S. Hwy 19	Recreation/ Drinking Water	PS	FC,FCG	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	13	2	1
Clear Creek (1)	Atlanta	Fishing	PS	FC,DO	CSO,UR	Atlanta under enforcement action to build CSO treatment facilities. Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Etta Vista Creek (20)	Gainesville	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Flowery Branch (25)	Hall County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	1	X	4
Four Mile Creek (7)	Lake Lanier Tributary, Forsyth County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4
Foxwood Branch (2)	Tributary to Rottenwood Creek	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	1	2	1
Hog Waller Creek (17)	Roswell	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Jasus Creek (9)	Northwest of Helen	Fishing	PS	Pb	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	2
Mud Creek (20)	South Hall County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
North Fork Balus Creek (20)	Gainesville	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	2	X	4
Proctor Creek (1, 8, 10)	Atlanta	Fishing	PS	FC	UR,CSO	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. CSO permit issued and requirements being met.	X	9	2	1
Rock Creek (20)	Gainesville	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Sawnee Creek (7)	Lake Lanier Tributary, Forsyth County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
Soque River (1)	Clarksville to Chattahoochee River	Fishing	PS	FC,Tox	M,I1	Clarksville under order to meet permit requirements. Scovill Fasteners implementing toxicity reduction evaluation to be completed by 4/3/96.	X	6	2	1
Tanyard Branch (1)	Atlanta	Fishing	PS	FC	UR,CSO	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. CSO permit issued and requirements being met.	X	2	2	1
Taylor Creek (26)	Dawson/Forsyth Counties	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4
Tesnatee Creek (1)	Cleveland	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	5	X	4
Toto Creek (26)	Dawson County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	1	X	4

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Trib. to West Fork Little River (1)	Hall County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	1	X	4
Tributary to Sope Creek (14)	Cobb County	Fishing	PS	Cd,Cu,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	1	2	1
Tributary to Mud Creek (14)	Cobb County	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Two Mile Creek (26)	Forsyth County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
Wahoo Creek (4)	Upstream Arnco Mills Lake	Fishing	PS	Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	7	X	4
Ward Creek (14)	Cobb County	Fishing	PS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	6	2	1
Woodall Creek (1)	Atlanta	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Yahoola Creek (1, 36)	Dahlonega WPCP to Chestatee River	Fishing	PS	Pb,Hg	UR,NP	EPD will address through a watershed protection strategy for the basin. Dahlonega in compliance with NPDES permit.	X	1	X	2

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
RIVERS AND STREAMS NOT SUPPORTING DESIGNATED USES - HUC 03130001										
Arrow Creek (15)	Atlanta	Fishing	NS	FC,Cu,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Ball Mill Creek (1, 15)	Fulton/DeKalb Counties	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Bubbling Creek (2, 15)	DeKalb County	Fishing	NS	FC,Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
Burnt Fork Creek (2, 15)	DeKalb County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	6	2	1
Chattahoochee River (1, 9)	Upstream Soque River	Recreation	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	11	X	4
Chattahoochee River (1, 9, 17)	U.S. Hwy. 19 to I-285	Recreation/ Drinking Water	NS	FC,FCG	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	11	2	1
Chattahoochee River (1, 9, 10, 22)	Soque River to Lake Lanier	Recreation	NS	Zn*,Cu*, Pb*,FC	I1,M,NP	Scovill Fasteners implementing a Toxicity Reduction Evaluation to be completed by 4/3/96. Clarkesville under Consent Order to complete plant upgrade by 7/1/96. EPD will address nonpoint sources though a watershed protection strategy for the basin.	X	13	2,X	1,4
Chattahoochee River (1, 2, 9)	I-285 Bridge to Peachtree Creek	Recreation/ Drinking Water	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	6	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Chattahoochee River (1, 11, 22)	Downstream Buford Dam	Recreation/ Drinking Water	NS	DO	Dam Release	Low DO in releases from dam at Lake Lanier. EPD is working with the Corps of Engineers to assess and implement feasible actions.	X	3	2	1
Chestatee River (1, 10, 22)	Dahlonega	Fishing	NS	FC	UR,NP	EPD will address through a watershed protection strategy for the basin. Dahlonega in compliance with NPDES permit.	X	19	X	4
Crooked Creek (1, 18)	Gwinnett County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
Deep Creek (1)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
East Fork Little River (26)	Downstream Hwy 52	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	6	X	4
Flat Creek (1,7,20 22,26)	Gainesville	Fishing	NS	Tox,FC	M,UR	Gainesville in compliance as of summer 1995. EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	6	2,X	1,4
Foe Killer Creek (17)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	7	2	1
James Creek (1)	Forsyth County	Fishing	NS	FC	NP,UR	EPD will address through a watershed protection strategy for the basin.	X	2	X	4
Johns Creek (1)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Level Creek (1)	Gwinnett County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	5	2	1
Limestone Creek (20, 22, 26)	Downstream Brenau Lake	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Limestone Creek (20)	Upstream Brenau Lake	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Long Island Creek (1)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	5	2	1
Longwood Park Creek (20)	Gainesville	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Lullwater Creek (15)	DeKalb County	Fishing	NS	FC, Cu, Zn	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
March Creek (1, 17)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1
Mossy Creek (1, 10)	Clermont	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	7	X	4
Nancy Creek (1, 2, 10, 15)	Atlanta	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	16	2	1
North Fork Peachtree Creek (2, 15, 18)	Atlanta	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	14	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Peachtree Creek (1, 10)	Atlanta	Fishing	NS	FC	UR,CSO	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. Atlanta Clear Creek CSO under enforcement action to install treatment facilities. Facility install	X	7	2	1
Peavine Creek (15)	DeKalb County	Fishing	NS	FC,Cu,Pb,Zn	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Richland Creek (1)	Gwinnett County	Fishing	NS	FC	UR	Buford Westside WPCP in compliance with permit. Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	5	2	1
Rottenwood Creek (1, 10, 14)	Cobb County	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	9	2	1
Sewell Mill Creek (1, 10, 14)	Cobb County	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1
Six Mile Creek (3, 7, 22, 26)	Forsyth County	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
Slaughterhouse Creek (20)	Gainesville	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a water protection strategy for the basin.	X	1	X	4
Sope Creek (1, 2, 10, 14)	Cobb County	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	11	2	1

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
South Fork Peachtree Creek (2, 10, 15)	Atlanta	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	15	2	1
South Fork Balus Creek (20)	Gainesville	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	2	X	4
South Fork Limestone Creek (20)	Gainesville	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	2	X	4
South Fork Mud Creek (1)	Cornelia	Fishing	NS	Tox,Cu,Zn	M	Cornelia under Order to reduce ammonia toxicity. Metals limits in NPDES Permit met December 1995.	X	2	2	1
Suwanee Creek (1)	Gwinnett County	Fishing	NS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin	X	4	X	4
Sweetwater Creek (1,2,10,14)	Cobb/Douglas Counties	Fishing	NS	FC,Cu,Pb	UR,M	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. Cobb County upgraded sewer lines and lift station in the area in 1994.	X	24	2	1
Utoy Creek (1,8,10)	Atlanta	Fishing	NS	F	UR,CSO	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin	X	5	2	1
Wahoo Creek (22, 26)	Hall County	Fishing	NS	FC	NP	EPD will address nonpoint source through a watershed protection strategy for the basin.	X	5	X	4
Wahoo Creek (1, 4)	Downstream Arnco Mills Lake	Fishing	NS	Bio,FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
West Fork Little River (10, 22, 26)	Hall County	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	11	X	4

Name	Location (HUC 03130001)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Willeo Creek (1, 10, 14, 17)	Cobb/Fulton Counties	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. County completed sewer system rehabilitation in that area.	X	5	2	1
Yahoola Creek (1, 36)	Dahlonega	Fishing	NS	FC,Hg	UR,NP	EPD will address through a watershed protection strategy for the basin. Mercury may be nonpoint source from past mining operations.	X	7	X	2

Data Source Codes (Column 1)

1 = EPD Watershed Planning and Monitoring Program
2 = EPD Permitting Compliance and Enforcement Program (Municipal)
4 = Wildlife Resources Division
7 = Gainesville College
8 = Georgia Institute of Technology
9 U.S. Environmental Protection Division
10 = U.S. Geologic Survey
11 = U.S. Army Corps of Engineers
14 = Cobb County
15 = DeKalb County
16 = Douglas County Water & Sewer Authority
17 = Fulton County
18 = Gwinnett County
20 = City of Gainesville
22 = Georgia Mountains, R.D.C.
25 = Lake Blackshear (Lake Blackshear Watershed Association)
26 = Lake Lanier (University of Georgia)
27 = West Point (LaGrange College/Auburn University
28 = Georgia Power Company
32 = Jones Ecological Resource Center
33 = Alabama DEM
34 = City of College Park
36 = University of Georgia
38 = Columbus Unified Government

Use Support Status (Column 4)

S = Supporting
PS = Partially Supporting
NS = Not Supporting

Criterion Violated Codes (Column 5)

Bio = Biota Impacted
Cd = Cadmium
Cu = Copper
DO = Dissolved Oxygen
FC = Fecal Coliform Bacteria
FCG = Fish Consumption Guidelines
Hg = Mercury
Pb = Lead
Temp = Temperature
Tox = Toxicity Indicated
Zn = Zinc
* = Minimal Database

Potential Cause Codes (Column 6)

CSO = Combined Sewer Overflow
I1 = Industrial Facility
M = Municipal Facility
NP = Nonpoint Sources/ Unknown Sources
UR = Urban Runoff/Urban Effects

Table E-2. Support of Designated Uses for Rivers and Streams in Hydrologic Unit 03130002 of the Chattahoochee River Basin, 1994–1995 (GA DNR, 1996)

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
RIVERS AND STREAMS SUPPORTING DESIGNATED USES - HUC 03130002										
Beech Creek (4)	Downstream Ross Keith Road	Fishing	S	N/A	N/A	N/A	N/A	17	NA	N/A
Big Branch (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Big Springs Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Blue Creek (4)	Meriwether County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Bluff Creek (16)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Box Springs Creek (4)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Browns Creek (4)	Coweta County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Brush Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Caney Creek (4)	Heard/Coweta Counties	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Caney Creek (4)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Carthbody Creek (4)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Cedar Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	9	NA	N/A
Crawford Creek (4)	Meriwether/Troup Counties	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Crews Creek (4)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Deer Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Dukes Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Flat Creek (4)	Meriwether County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Flybow Creek (4)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Gothard's Creek (4)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	11	NA	N/A
Gum Creek (4)	Heard/Carroll Counties	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Harris Creek (1)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Hillabahatchee Creek (1,4)	Tolieson Branch to Glovers Road	Fishing	S	N/A	N/A	N/A	N/A	22	NA	N/A
Hillabahatchee Creek (1)	Franklin	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Hurricane Creek (1,4)	Douglas/Carroll Counties	Fishing	S	N/A	N/A	N/A	N/A	7	NA	N/A
Ingram Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Keaton Creek(16)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Little Bear Creek (2)	Palmetto	Fishing	S	N/A	N/A	N/A	N/A	5	NA	N/A
Little Snake Creek (4,10)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Little Taylor Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Maple Branch (4)	Coweta	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Messiers Creek (4)	Coweta County	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Moore Creek (1)	Coweta County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Mud Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	9	NA	N/A
Mulberry Creek (1, 10)	Mulberry Grove	Fishing	S	N/A	N/A	N/A	N/A	8	NA	N/A
New River (4, 26)	Heard/Coweta Counties	Fishing	S	N/A	N/A	N/A	N/A	24	NA	N/A
Nutt Creek (1)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Ossahatchie Creek (10)	Near Cataula-Hwy 1 to Hwy 85	Fishing	S	N/A	N/A	N/A	N/A	7	NA	N/A
Pink Creek (1, 4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Polecat Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	9	NA	N/A
Sandy Creek (4)	Carroll County	Fishing	S	N/A	N/A	N/A	N/A	3	NA	N/A
Sandy Creek (4)	Coweta County	Fishing	S	N/A	N/A	N/A	N/A	9	NA	N/A
Shoal Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	11	NA	N/A
Slater Mill Creek (4)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	2	NA	N/A
Sulfur Creek (4)	Downstream White Sulfur Creek	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Tanyard Creek (4, 16)	Douglas County	Fishing	S	N/A	N/A	N/A	N/A	2	N/A	N/A
Thomas Creek (1, 4)	Coweta County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Town Creek (1, 4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Wehadkee Creek (4)	Heard County	Fishing	S	N/A	N/A	N/A	N/A	7	NA	N/A
White Sulfur Creek (4)	Meriwether County	Fishing	S	N/A	N/A	N/A	N/A	9	NA	N/A
Whitewater Creek (4)	Heard/Troup Counties	Fishing	S	N/A	N/A	N/A	N/A	17	NA	N/A
Wildcat Creek (4)	Troup County	Fishing	S	N/A	N/A	N/A	N/A	4	NA	N/A
Yellow Dirt Creek (1, 4)	Carroll/Heard Counties	Fishing	S	N/A	N/A	N/A	N/A	10	NA	N/A
Yellow Jacket Creek (4, 29)	Upstream West Point Lake	Fishing	S	N/A	N/A	N/A	N/A	31	NA	N/A
RIVERS AND STREAMS PARTIALLY SUPPORTING DESIGNATED USES - HUC 03130002										
Name	**Location (HUC 03130002)**	**Use Classification**	**Status**	**Criteria Violated**	**Evaluated Causes**	**Actions to Alleviate**	**305(b)**	**Miles**	**303(d) Listing**	**Priority**
Acorn Creek (1, 4)	Carroll County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
Baldwin Creek (16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	4	X	4
Bear Creek (1, 4, 16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	4	X	4
Bear Creek (1)	Fulton County	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1
Beech Creek (4)	Meriwether County Upstream Ross Keith Road	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	10	X	4

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Blue John Creek (1, 4, 21, 27)	LaGrange	Fishing	PS	FC,Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	8	X	4
Cavender Creek (4)	Carroll County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
Cedar Creek (1, 4)	Coweta County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	6	X	4
Centralhatchee Creek (1, 4)	Heard County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	19	X	4
Chattahoochee River (1, 10, 11)	West Point Dam to Johnson Island	Fishing	PS	DO	Dam Release	Dam Release. EPD will work with the Corps of Engineers to assess and implement feasible actions.	X	13	X	2,3
Cracker Creek (1)	Douglas County	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	X	4
Crawfish Creek (4, 16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4
Dog River (4, 16)	Hwy 5 to Dog River Reservoir	Drinking Water	PS	Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	X	4
Dog River (4, 16)	Upstream Hwy 5	Drinking Water	PS	FC,Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	X	4
Flatshoals Creek (4)	Meriwether County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	7	X	4
Fromby Creek (4)	Heard County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4
Hilly Mill Creek (1, 4)	Heard/Coweta Counties	Fishing	PS	FC,Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	6	X	4

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Little Bear Creek (4, 16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
Long Cane Creek (4)	Upstream LaGrange WPCP	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	19	X	4
Long Branch (4)	Coweta County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	4	X	4
Mineral Springs Branch (1)	Newnan Upstream from Bonnell	Fishing	PS	Pb	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	1	X	2
Mineral Springs Branch (1, 4)	Newnan	Fishing	PS	Bio,Tox	I1,UR	Bonnell implementing toxicity reduction evaluation to be completed by 7/30/96. EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	2,X	14
Mobley Creek (4, 16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	7	X	4
Mountain Oak Creek (1)	Hamilton	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
Mountain Creek (4)	Newnan	Fishing	PS	Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	14	X	4
Mt. Hope Branch (4)	Meriwether County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	4	X	4
Nancy Long Creek (16)	Douglas County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
North Utoy Creek (1)	Atlanta	Fishing	PS	FC	UR,CSO	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. Atlanta under order to eliminate Utoy Creek CSO.	X	6	2	1
Ollie Creek (4)	Meriwether County	Fishing	PS	Bio,DO	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	1	X	2
Panther Creek (4)	Coweta County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	3	X	4
Pea Creek (1)	Fulton County	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	3	2	1
Pepperell Creek (2)	LaGrange	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Redbud Creek (4)	Heard County	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4
Snake Creek (1, 4, 10)	Carroll County	Fishing	PS	FC,Hg*, Pb*	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	12	X	4
Snake Creek (4)	Coweta County	Fishing	PS	Bio	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	4	X	4
Sulfur Creek (4)	Upstream White Sulfur Creek	Fishing	PS	Bio	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	7	X	4

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Tanyard Creek (1, 21)	LaGrange	Fishing	PS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	2	X	4
Whooping Creek (1, 4)	Carroll County	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	13	X	4
RIVERS AND STREAMS NOT SUPPORTING DESIGNATED USES - HUC 03130002										
Name	**Location (HUC 03130002)**	**Use Classification**	**Status**	**Criteria Violated**	**Evaluated Causes**	**Actions to Alleviate**	**305(b)**	**Miles**	**303(d) Listing**	**Priority**
Anneewakee Creek (1, 4, 16)	Douglas County	Fishing	NS	FC,Bio	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	6	2	1
Bishop Creek (2, 14)	Cobb County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
Buttermilk Creek (14)	Cobb County	Fishing	NS	FC,Cd,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1
Camp Creek (1)	Fulton County	Fishing	NS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	4	2	1
Chattahoochee River (1, 9, 10)	Pea Creek to Franklin	Fishing	NS	FC,Pb, FCG	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	42	2	1

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Chattahoochee River (1, 2, 9)	Peachtree Creek to Utoy Creek	Fishing	NS	FC,Pb, Temp,Tox	CSO,I1,M,UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. CSO permit issued and requirements being met. EPD working with Georgia Power and Atlanta and Cobb.	X	9	2	1
Chattahoochee River (1, 9)	Utoy Creek to Pea Creek	Fishing	NS	Pb*,Cu*, FC,FCG	UR,CSO	Atlanta and Fulton County facilities in compliance with NPDES permits. Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. Utoy Creek CSO under Enforcement Order	X	14	2	1
Dixie Creek (2, 26)	LaGrange	Fishing	NS	FC	UR	EPD will address nonpoint source (urban runoff) through a watershed protection strategy for the basin.	X	3	X	4
Flat Shoal Creek (1, 10)	West Point	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	26	X	4
House Creek (16)	Douglas County	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	2	X	4
Lee Branch (1, 21)	LaGrange	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Long Cane Creek (1, 4)	LaGrange to Chattahoochee River	Fishing	NS	Cu*,Zn*, Pb*,Bio, DO	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin. LaGrange discharge diverted to Chattahoochee 9/10/93. Metals data collected prior to diversion.	X	14	X	2
Mud Creek (14)	Cobb County	Fishing	NS	FC,Pb*	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	5	2	1

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
New River (1)	Corinth	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	4	X	4
Nickajack Creek (1, 2, 10, 14)	Cobb County	Fishing	NS	Pb,FC	I1,UR	Lockheed is implementing an Individual Control Strategy. Scheduled for completion by 7/1/96. Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	11	2	1
Noses Creek (14)	Cobb County	Fishing	NS	Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	11	2	1
Olley Creek (2, 14)	Cobb County	Fishing	NS	FC,Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	11	2	1
Park Branch (1, 21)	LaGrange	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	2	X	4
Powder Springs Creek (14)	Cobb County	Fishing	NS	Pb	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	7	2	1
Sandy Creek (1)	Fulton County	Fishing	NS	FC,DO	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	2	2	1
South Utoy Creek (8)	Atlanta	Fishing	NS	Tox,FC	UR,I2	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94. US Plywood site identified.	X	5	2	1

Name	Location (HUC 03130002)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Troup Branch (21)	LaGrange	Fishing	NS	FC	UR	EPD will address nonpoint sources (urban runoff) through a watershed protection strategy for the basin.	X	1	X	4
Wolf Creek (1, 4)	Douglas/Carroll Counties	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	10	X	4
Yellowjacket Creek (1)	LaGrange	Fishing	NS	FC	UR	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	5	X	4

Data Source Codes (Column 1)

1 = EPD Watershed Planning and Monitoring Program
2 = EPD Permitting Compliance and Enforcement Program (Municipal)
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7 = Gainesville College
8 = Georgia Institute of Technology
9 U.S. Environmental Protection Division
10 = U.S. Geologic Survey
11 = U.S. Army Corps of Engineers
14 = Cobb County
15 = DeKalb County
16 = Douglas County Water & Sewer Authority
17 = Fulton County
18 = Gwinnett County
20 = City of Gainesville
22 = Georgia Mountains, R.D.C.
25 = Lake Blackshear (Lake Blackshear Watershed Association)
26 = Lake Lanier (University of Georgia)
27 = West Point (LaGrange College/Auburn University
28 = Georgia Power Company
32 = Jones Ecological Resource Center
33 = Alabama DEM
34 = City of College Park
36 = University of Georgia
38 = Columbus Unified Government

Use Support Status (Column 4)

S = Supporting
PS = Partially Supporting
NS = Not Supporting

Criterion Violated Codes (Column 5)

Bio = Biota Impacted
Cd = Cadmium
Cu = Copper
DO = Dissolved Oxygen
FC = Fecal Coliform Bacteria
FCG = Fish Consumption Guidelines
Hg = Mercury
Pb = Lead
Temp = Temperature
Tox = Toxicity Indicated
Zn = Zinc
* = Minimal Database

Potential Cause Codes (Column 6)

CSO = Combined Sewer Overflow
I1 = Industrial Facility
M = Municipal Facility
NP = Nonpoint Sources/ Unknown Sources
UR = Urban Runoff/Urban Effects

Table E-3. Support of Designated Uses for Rivers and Streams in Hydrologic Unit 03130003 of the Chattahoochee River Basin, 1994–1995 (GA DNR, 1996).

Name	Location (HUC 03130003)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
RIVERS AND STREAMS SUPPORTING DESIGNATED USES - HUC03130003										
Pataula Creek (1)	Hodchodkee Creek to W F George	Fishing	S	N/A	N/A	N/A	N/A	6	NA	N/A
Roaring Branch (1)	Upstream Columbus Foundries	Fishing	S	N/A	N/A	N/A	N/A	1	NA	N/A
Upatoi Creek (1, 10)	Columbus	Fishing	S	N/A	N/A	N/A	N/A	14	NA	N/A
RIVERS AND STREAMS PARTIALLY SUPPORTING DESIGNATED USES - HUC - 03130003										
Name	**Location (HUC 03130003)**	**Use Classification**	**Status**	**Criteria Violated**	**Evaluated Causes**	**Actions to Alleviate**	**305(b)**	**Miles**	**303(d) Listing**	**Priority**
Chattahoochee River (1,2)	N. Highland Dam to Upatoi Creek	Fishing	PS	FC,Tox, FCG	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95. Columbus completed toxicity reduction evaluation and eliminated toxicity in 1995. Columbus in compliance with CSO permit re	X	12	2	1
Double Branch (38)	Columbus	Fishing	PS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	1	2	1
Drag Nasty Creek (1)	Tributary to W. F. George	Fishing	PS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	7	X	4
Flatrock Creek (38)	Columbus	Fishing	PS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	3	2	1
Heiferhorn Creek (2, 38)	Columbus	Fishing	PS	Cu,pH	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	3	2	1
Randall Creek (38)	Columbus	Fishing	PS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	3	2	1

Name	Location (HUC 03130003)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Rocky Branch (2)	Columbus	Fishing	PS	FC	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	2	2	1
Tiger Creek (38)	Columbus	Fishing	PS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	3	2	1
Turkey Creek (38)	Columbus	Fishing	PS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	1	2	1
RIVERS AND STREAMS NOT SUPPORTING DESIGNATED USES - HUC 03130003										
Name	**Location (HUC 03130003)**	**Use Classification**	**Status**	**Criteria Violated**	**Evaluated Causes**	**Actions to Alleviate**	**305(b)**	**Miles**	**303(d) Listing**	**Priority**
Bull Creek	Columbus	Fishing	NS	FC,Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	11	2	1
Chattahoochee River	Upatoi Creek to Railroad at Omaha	Fishing	NS	FC,Pb	CSO,UR	Columbus meeting CSO permit requirements. Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95. Columbus plants not toxic based on testing and in compliance with NPDES permit in	X	31	2	1
Cooper Creek (38)	Columbus	Fishing	NS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	6	2	1
Dram Creek (38)	Columbus	Fishing	NS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	1	2	1
Hannahatchee Creek (1)	U.S. Hwy 27 to Lake W.F. George	Fishing	NS	FC	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	14	X	4

Name	Location (HUC 03130003)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
Lindsey Creek (38)	Columbus	Fishing	NS	Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was issued on 6/15/94.	X	6	2	1
Roaring Branch (1, 38)	Downstream Columbus Foundries	Fishing	NS	Pb*,Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	2	2	1
Weracoba Creek (2,38)	Columbus	Fishing	NS	FC,Cu	UR	Urban runoff is being addressed in EPD Stormwater Management Strategy. An areawide stormwater permit was issued on 4/20/95.	X	6	2	1

Data Source Codes (Column 1)

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16 = Douglas County Water & Sewer Authority
17 = Fulton County
18 = Gwinnett County
20 = City of Gainesville
22 = Georgia Mountains, R.D.C.
25 = Lake Blackshear (Lake Blackshear Watershed Association)
26 = Lake Lanier (University of Georgia)
27 = West Point (LaGrange College/Auburn University
28 = Georgia Power Company
32 = Jones Ecological Resource Center
33 = Alabama DEM
34 = City of College Park
36 = University of Georgia
38 = Columbus Unified Government

Use Support Status (Column 4)

S = Supporting
PS = Partially Supporting
NS = Not Supporting

Criterion Violated Codes (Column 5)

Bio = Biota Impacted
Cd = Cadmium
Cu = Copper
DO = Dissolved Oxygen
FC = Fecal Coliform Bacteria
FCG = Fish Consumption Guidelines
Hg = Mercury
Pb = Lead
Temp = Temperature
Tox = Toxicity Indicated
Zn = Zinc
* = Minimal Database

Potential Cause Codes (Column 6)

CSO = Combined Sewer Overflow
I1 = Industrial Facility
M = Municipal Facility
NP = Nonpoint Sources/ Unknown Sources
UR = Urban Runoff/Urban Effects

Table E-4. Support of Designated Uses for Rivers and Streams in Hydrologic Unit 03130004 of the Chattahoochee River Basin, 1994–1995 (GA DNR, 1996)

Name	Location (HUC 03130004)	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	305(b)	Miles	303(d) Listing	Priority
RIVERS AND STREAMS SUPPORTING DESIGNATED USES - HUC 03130004										
Chattahoochee River (1, 10)	Downstream Fort Gaines	Fishing	S	N/A	N/A	N/A	N/A	38	NA	N/A
RIVERS AND STREAMS PARTIALLY SUPPORTING DESIGNATED USES - HUC 03130004										
Chattahoochee River (1, 11)	Downstream W.F. George Dam	Fishing	PS	DO,FC	Dam Release	Dam Release. EPD will work with the Corps of Engineers to assess and implement feasible actions.	X	2	X	2,3
Chattahoochee River (1)	US Hwy 84 to Lake Seminole	Recreation	PS	Pb*	NP	EPD will address nonpoint sources through a watershed protection strategy for the basin.	X	17	X	4

Data Source Codes (Column 1)

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2 = EPD Permitting Compliance and Enforcement Program (Municipal)
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9 U.S. Environmental Protection Division
10 = U.S. Geologic Survey
11 = U.S. Army Corps of Engineers
14 = Cobb County
15 = DeKalb County
16 = Douglas County Water & Sewer Authority
17 = Fulton County
18 = Gwinnett County
20 = City of Gainesville
22 = Georgia Mountains, R.D.C.
25 = Lake Blackshear (Lake Blackshear Watershed Association)
26 = Lake Lanier (University of Georgia)
27 = West Point (LaGrange College/Auburn University
28 = Georgia Power Company
32 = Jones Ecological Resource Center
33 = Alabama DEM
34 = City of College Park
36 = University of Georgia
38 = Columbus Unified Government

Use Support Status (Column 4)

S = Supporting
PS = Partially Supporting
NS = Not Supporting

Criterion Violated Codes (Column 5)

Bio = Biota Impacted
Cd = Cadmium
Cu = Copper
DO = Dissolved Oxygen
FC = Fecal Coliform Bacteria
FCG = Fish Consumption Guidelines
Hg = Mercury
Pb = Lead
Temp = Temperature
Tox = Toxicity Indicated
Zn = Zinc
* = Minimal Database

Potential Cause Codes (Column 6)

CSO = Combined Sewer Overflow
I1 = Industrial Facility
M = Municipal Facility
NP = Nonpoint Sources/ Unknown Sources
UR = Urban Runoff/Urban Effects

Table E-5. Support of Designated Uses for Lakes and Reservoirs in the Chattahoochee River Basin, 1994–1995 (GA DNR, 1996)

Name	Location (HUC) and Portion Covered	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	Acres	303(b)	303(d) Listing	Priority
LAKES AND RESERVOIRS SUPPORTING DESIGNATED USES										
Lake Lanier (part) (25)	HUC 03130001 Entire lake *excluding* Six Mile Creek Embayment and Clark's Bridge Area	Recreation	S	N/A	N/A	N/A	36,742	N/A	NA	N/A
Goat Rock Lake (part) (28)	HUC 03130002 Part of Lake	Recreation, Drinking Water	S	N/A	N/A	N/A	477	N/A	NA	N/A
Lake Andrews	HUC 03130004 Entire Lake	Fishing	S	N/A	N/A	N/A	1540	N/A	NA	N/A
LAKES AND RESERVOIRS PARTIALLY SUPPORTING DESIGNATED USES										
Lake Lanier (part) (25)	HUC 03130001 Six Mile Creek Embayment	Recreation	PS	Hg	NP	Will be addressed through ongoing Lake Lanier Water Quality Cooperative River Basin Study.	1,100	X	X	2
Lake Lanier (part) (9, 25)	HUC 03130001 Clark's Bridge Area	Recreation	PS	pH,Pb	NP	Will be addressed through ongoing Lake Lanier Water Quality Cooperative Basin Study.	700	X	X	2
Lake Harding (1, 28, 33)	HUC 03130002 Entire Lake	Fishing, Recreation, Drinking Water	PS	FCG	NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed.	5,851	X	X	4
Goat Rock Lake (part) (28)	HUC 03130002 Part of Lake	Fishing	PS	Cu,FCG	NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed. EPD will continue to monitor copper concentrations.	573	X	X	2

Name	Location (HUC) and Portion Covered	Use Classification	Status	Criteria Violated	Evaluated Causes	Actions to Alleviate	Acres	303(b)	303(d) Listin g	Priority
Lake W.F. George (part) (1, 33)	HUC 03130003 Upstream of Hwy. 82	Recreation, Fishing	PS	Pb,FCG	UR,NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed. EPD will continue to monitor lead concentrations.	12,000	X	X	1,4
Lake W.F. George (part) (1, 33)	HUC 03130003 Below Hwy. 82	Recreation	PS	FCG	UR,NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed.	32,219	X	X	1,4
Lake Seminole (part) (11)	HUC 03130004 Part of Lake	Fishing	PS	FCG	NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed.	17,000	X	X	4
Lake Seminole (part) (11)	HUC 03130004	Fishing	PS	FCG	NP,UR	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed.	20,515	X	X	4
LAKES AND RESERVOIRS NOT SUPPORTING DESIGNATED USES										
Lake Oliver (28)	HUC 03130002 Entire Lake	Drinking Water, Recreation	NS	FCG	NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed.	2,150	X	X	4
West Point Lake (1,6,27,33)	HUC 03130002 Entire Lake	Drinking Water, Recreation, Fishing	NS	FCG	UR, NP	GA DNR will continue to monitor fish tissue and revise fish consumption guidelines as needed	24,911	X	X	1,4

Data Source Codes (Column 1)

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7	=	Gainesville College
8	=	Georgia Institute of Technology
9		U.S. Environmental Protection Division
10	=	U.S. Geologic Survey
11	=	U.S. Army Corps of Engineers
14	=	Cobb County
15	=	DeKalb County
16	=	Douglas County Water & Sewer Authority
17	=	Fulton County
18	=	Gwinnett County
20	=	City of Gainesville
22	=	Georgia Mountains, R.D.C.
25	=	Lake Blackshear (Lake Blackshear Watershed Association)
26	=	Lake Lanier (University of Georgia)
27	=	West Point (LaGrange College/Auburn University
28	=	Georgia Power Company
32	=	Jones Ecological Resource Center
33	=	Alabama DEM
34	=	City of College Park
36	=	University of Georgia
38	=	Columbus Unified Government

Use Support Status (Column 4)

S	=	Supporting
PS	=	Partially Supporting
NS	=	Not Supporting

Criterion Violated Codes (Column 5)

Bio	=	Biota Impacted
Cd	=	Cadmium
Cu	=	Copper
DO	=	Dissolved Oxygen
FC	=	Fecal Coliform Bacteria
FCG	=	Fish Consumption Guidelines
Hg	=	Mercury
Pb	=	Lead
Temp	=	Temperature
Tox	=	Toxicity Indicated
Zn	=	Zinc
*	=	Minimal Database

Potential Cause Codes (Column 6)

CSO	=	Combined Sewer Overflow
I1	=	Industrial Facility
M	=	Municipal Facility
NP	=	Nonpoint Sources/ Unknown Sources
UR	=	Urban Runoff/Urban Effects

Appendix F

Georgia Adopt-A-Stream Program

Current Groups List   January 1997

Chattahoochee River Basin

Stream : Balus Creek (Hall)
Name : Cheryl & Alan Shedd
4655 Lanier Blvd.
Oakwood, Georgia 30566

Stream : Balus, Limestone, Flat Creeks (Hall)
Name : Diana Dean
Hall Clean Council
P.O. Box 1124
Gainesville, GA 30503

Stream : Bull Creek (Muscogee)
Name : Anise Lester
Key Elementary
River Kids Network
2520 Broadmoor Dr.
Columbus, GA 31907

Stream : Bull Creek (Muscogee)
Name : Lisa Skinner
Dimon Magnet
River Kids Network
480 Dogwood Dr.
Columbus, GA 31907

Stream : Bull Creek (Muscogee)
Name : Betsy Zachry
Fort Middle School
2900 Woodruff Farm Rd.
Columbus, GA 31907

Stream : Bull Creek (Muscogee)
Name : Toni Sherrill
Waddell Elementary
River Kids Network
1601 Miller Rd.
Columbus, GA 31907

Stream : Cathy, Turner, and Dukes Creek(White)
Name : Suzanne Belflower
White County Middle School
S.E.A.T.
P.O. Box 3035
Cleveland, GA 30528

Stream : City of Alpharetta (Fulton)
Name : Dee West
Alpharetta Clean and Beautiful
131 Roswell Street
Suite A-1
Alpharetta, Georgia 30201

Stream : City of Roswell (Fulton)
Name : Nancy Womack
City of Roswell
38 Hill Street, Suite G-50
Roswell, Georgia 30075

Stream : Cooper Creek (Muscogee)
Name : Lorrie Watt
Edgewood Elementary
River Kids Network
3835 Forrest Road
Columbus, GA 31907

Stream : Dicks Creek, Blood Mountain Creek, Waters Creek, Miller Creek, Lance Creek (White)
Name : Ronald Bass
247's Creek Crew
3580 River Ferry Dr.
Alpharetta, GA 30202

Stream : Dog River (Douglas)
Name : Gail Marshall
Alexander High School
6500 Alexander Parkway
Douglasville, Georgia 30135

Stream : Douglas County
Name : Terri Cole
Douglas County Water and Sewer Authority
P.O. Box 1157
Douglasville, Georgia 30133

Stream : Dukes Creek (White)
Name : Kimberly Brooks
Smithgall Woods Conservation Area DNR
61 Tsalaki Trail
Helen, GA 30545

Stream : Flat Creek (Hall)
Name : Jerry Ferguson
3580 Ridgewood Point
Gainesville, GA 30504

Stream : Flat Creek (Hall)
Name : Ed Grill
3585 Ridgewood Pl.
Gainesville, GA 30504

Stream : Flat Creek (Hall)
Name : John Reed
Packaging Specialties
2390 Murphy Blvd
Gainesville, GA 30504

Stream : Flat Creek and others (Hall)
Name : Tim Merritt
City of Gainesville
P.O. Box 2496
Gainesville, GA 30503-2496

Stream : Flat Creek (Hall)
Name : David Dockery
City of Gainesville
P.O. Box 2496
Gainesville, GA 30503

Stream : Flat Rock Creek (Muscogee)
Name : Marjorie Curtis
Richards Middle School - River Kids Network
2892 Edgewood Road
Columbus, GA 31906

Stream : Fulton Co.: 7 streams (Fulton)
Name : Suzanne Cate
Mountain Park Adopt-A-Stream
138 Walnut St.
Mt. Park, GA 30075

Stream : Glen Lake Creek (DeKalb)
Name : Buddy Goodloe
Clairemont Elementary School
155 Erie Ave.
Decatur, GA 30030

Stream : Henderson Mill Ck. (DeKalb)
Name : Amy Delaplaine
Northlake Rotary Club
2970 Clairmont Rd.
Suite 240
Atlanta, GA 30329

Stream : Ivy Branch
Name : Joanne Steele
SNCA
PO Box 66
Sautee, GA 30571

Stream : Lake Lanier
Name : Edmond Mayhew
Gainesville College
P.O. Box 1358
Gainesville, GA 30503

Stream : Lake Lanier/Suwanee Creek (Gwinnett)
Name : William C. Bailey
Allegiance Healthcare Corporation
6145 Atlantic Boulevard
Norcross, GA 30071

Stream : Lanier Park (Gwinnett)
Name : Kevin Garris
Cub Scout Pack 513
5215 Maltide Court
Sugar Hill, GA 30243

Stream : Limestone Creek (Hall)
Name : Faye Bush
Newtown Florist Club
1053 Desoto Street
Gainesville, GA 30501

Stream : Limestone Creek (Hall)
Name : Gregory Valpey
417 Green Street
Gainesville, GA 30501

Stream : Lincoln Hill Creek (Muscogee)
Name : Barbara Inman
Blanchard Elementary
River Kids Network
3512 Weems Rd.
Columbus, GA 31909

Stream : Lincoln Hill Creek (Muscogee)
Name : Becky Kimbrel
Blanchard Elementary
River Kids Network
3512 Weems Rd.
Columbus, GA 31909

Stream : Lincoln Hills Creek (Muscogee)
Name : Penny Bailey
Blanchard Elementary
River Kids Network
3512 Weems Rd.
Columbus, GA 31909

Stream : Lindsey Creek (Muscogee)
Name : Dee Shore
Clubview Elementary School
River Kids Network
2836 Edgewood Road
Columbus, GA 31906

Stream : Lindsey Creek (Muscogee)
Name : Tamara Albright
Clubview Elementary
River Kids Network
2836 Edgewood Rd.
Columbus, GA 31906

Stream : Lindsey Creek (Muscogee)
Name : Meridith Hemmings
Clubview Elementary
River Kids Network
2836 Edgewood Rd
Columbus, GA 31906

Stream : Lindsey Creek (Muscogee)
Name : Jean Norman
Clubview Elementary
River Kids Network
2836 Edgewood Rd.
Columbus, GA 31906

Stream : Long Island Creek
Name : David Fountain
Streams Alive!
Fulton County Public Works
760 Crest Valley Drive
Atlanta, GA 30327

Stream : Marsh Creek (Fulton)
Name : Brian & Jessica Tully
North River Neighborhood Assoc., Inc.
Marsh Creek Protectors
215 River Court Pkwy
Atlanta, GA 30328

Stream : Mill Branch (Muscogee)
Name : Donna Barkdull
Georgetown Elementary
954 High Lane
Columbus, GA 31907

Stream : Nancy Creek (Cobb)
Name : Brenda Brochstein
Sutton Middle School
Sutton Streamkeepers
3420 Pine Meadow Rd.
Atlanta, GA 30327

Stream : Nancy Creek (DeKalb)
Name : Barbara Broadway
Dunwoody High School
5035 Vermack Rd.
Dunwoody, Georgia 30338

Stream : Nancy Creek (Fulton)
Name : Betty Balentine
Peachtree Garden Club
3015 Andrews Dr.
Atlanta, Georgia 30305

Stream : Nancy Creek (Fulton)
Name : Diane Minick
HOPE of Pace Academy
966 W. Paces Ferry Rd. NW
Atlanta, GA 30327

Stream : Nancy and Long Island Creeks (Fulton)
Name : Norm Fagge
Holy Innocents Episcopal School
Golden Bears
805 Mount Vernon Highway NW
Atlanta, GA 30327

Stream : Niagra Branch(White)
Name : Renee Carter and Adele Page
White County Elementary
329 Old Blairsville Rd.
Cleveland, GA 30528

Stream : Peachtree Creek (Fulton)
Name : Alan Toney
7260 Wynhill Dr.
Sandy Springs, GA 30328

Stream : Peachtree Creek(Fulton)
Name : Lory Leyva
Trinity School
River Kids Network
3254 Northside Pkwy
Atlanta, GA 30327

Stream : Peachtree Creek(Fulton)
Name : Cissie White
Trinity School
River Kids Network
3254 Northside Pkwy
Atlanta, GA 30327

Stream : Peavine Creek
Name : Leslie & Robert Edwards
1534 Emory Rd.
Atlanta, GA 30306

Stream : Peavine Creek
Name : Dorothy Sloan
440 Melrose Ave
Decatur, GA 30031

Stream : Peavine Creek
Name : Cynthia Tauxe
1553 Emory Rd.
Atlanta, GA 30306

Stream : Peavine Creek (DeKalb)
Name : Shannon Hagen
2606 Woodridge Dr.
Decatur, GA 30033

Stream : Peavine Creek (DeKalb)
Name : Kris Kurz
NRCS Americorps
DeKalb Parks
3681 Chestnut St.
Building A
Scottdale, GA 30079

Stream : Peavine Creek (DeKalb)
Name : Karrie Jo Shell
Brownie Troop No. 3220
3797 Brandeis Court
Decatur, GA 30034

Stream : Peavine Creek (DeKalb)
Name : Barrett Walker
1729 Coventry Place
Decatur, Georgia 30030

Stream : Peavine Creek (Fulton)
Name : Marien Pauly
Renfroe Middle School
Conservation Club
220 W. College Ave.
Decatur, GA 30030

Stream : Peavine Creek(Dekalb)
Name : Bill Witherspoon
Friends School of Atlanta
Stream Adventurers of FSA
2897 Country Squire Lane
Decatur, GA 30033

Stream : Powers Mill Creek (Fulton)
Name : Dr. Sally Hewes
Spalding Drive Elementary
130 Spalding Drive
Atlanta, GA 30328

Stream : Proctor Creek (Atlanta area)
Name : Dan Lemmey
City of Atlanta
Bureau of Planning
68 Mitchell St.
South Bldg., Suite 3350
Atlanta, Georgia 30335-0308

Stream : Proctor Creek (Fulton)
Name : Melissa Duff
West Fulton Middle School
Bankhead Eco-Players
1890 Bankhead Hwy., NW
Atlanta, GA 30318

Stream : Proctor Creek (Fulton)
Name : Dana Poole
UC RiverKeeper
295 12th Fairway
Roswell, GA 30076

Stream : Roaring Branch Creek (Muscogee)
Name : Steve Dashiell
Brookstone School
Rivers Kids Network
440 Bradley Park Dr.
Columbus, GA 31995

Stream : Rock Creek (Hall)
Name : Cindy Smith
Gainesville Middle School
715 Woods Mill Rd.
Gainesville, GA 30501

Stream : Rottenwood Creek (Cobb)
Name : Glynn Groszmann
Sierra Club Centennial Group
160 Thompson Place
Roswell, Georgia 30075

Stream : Rottenwood Creek (Cobb)
Name : Teri Ballard
Michael Baker, Jr., Inc.
Project Rottenwood
1800 Water Place, Suite 170
Atlanta, GA 30339

Stream : Rottenwood Creek (Cobb)
Name : Nancy Walton
The Lovett School
Middle School Science Teacher
4075 Paces Ferry Road, NW
Atlanta, GA 30327-3099

Stream : Rottenwood Creek (Cobb)
Name : Spott/ Walton/Herrig
The Lovett School
River Kids Network
4075 Paces Ferry Rd. NW
Atlanta, GA 30327

Stream : Rottenwood Creek (Fulton)
Name : Sharon Norman
Lovett School
4075 Paces Ferry Rd., NW
Atlanta, Georgia 30327

Stream : Sautee Creek branch (White)
Name : Jimmy Johnston
Sautee-Nacoochee Community Association
Sautee-Nacoochee Adopt-A-Stream
P.O. Box 66
Sautee-Nacoochee, GA 30571

Stream : Settingdown Creek (Forsyth)
Name : Lynn Pugh
520 Tribble Gap Rd.
Cumming, GA 30130

Stream : Sope Creek (Cobb)
Name : Barbara Hopper
Environmental Club of Walton High School
1590 Bill Murdock Rd.
Marietta, GA 30062

Stream : Sope Creek, Marsh Creek (Fulton)
Name : Judi Carter
North Springs High School
The Marshers
7447 Roswell Raod
Atlanta, GA 30328

Stream : Sope Creek, Rottenwood Creek (Cobb)
Name : Philip White
Cobb County Water System
Storm Water Division
3574 Kennesaw Station Dr.
Kennesaw, GA 30144-1983

Stream : Soque/Chattahoochee Rivers
Name : Brenda Hunt
North Habersham Middle School
51 Westmoreland Road
Cleveland, Georgia 30528

Stream : South Peachtree Creek (DeKalb)
Name : Dave Butler
South Peachtree Creek Nature Preserve, Inc.
P.O. Box 33247
Decatur, GA 30033

Stream : Suwanee Creek
Name : Donna Guest
Gwinnett County Sierra Club
PO Box 956833
Duluth, GA 30136

Stream : Suwanee Creek (Gwinnett)
Name : Kindra Jones
Suwanee Elementary School
3875 Smithtown Rd.
Suwanee, GA 30174

Stream : Tanyard Creek (Fulton)
Name : Kevin McMahon
Boy Scout Troup 67
104 Ardmore Place
Atlanta, GA 30309

Stream : Turkey Creek (Muscogee)
Name : Wanda Farr
Cusseta Rd. Elementary
River Kids Network
4150 Cusseta Rd.
Columbus, GA 31903

Stream : Whooping and Buffalo Creeks (Carroll)
Name : Georgia Evans
Carrollton Elementary School
401 Stadium Drive
Carrollton, GA 30117

Stream : Wildcat Creek(DeKalb)
Name : Deron Davis
Dunwoody Nature Center
Wildcat Stream Team
P.O. Box 88834
Dunwoody, GA 30356

Stream : Wildcat Stream (DeKalb)
Name : Nancy Gerson
Dunwoody Nature Center
Wildcat Stream Team
680 Amster Green Dr.
Atlanta, GA 30350

Stream : unamed (DeKalb)
Name : Paul Tillman
Sequoyah Middle School
Ecology Club
6800 Lisa Lane
Dunwoody, GA 30338-3952

Stream : unamed (Fulton)
Name : Haley Harden
Sandy Springs Middle School
8750 Colonel Dr.
Atlanta, GA 30350

Stream : unamed
Name : Les Sewall
East Coweta High School
Science Dept.
400 McCollum-Sharpsburg Rd.
Sharpsburg, GA 30277